BIOLOGICAL EVALUATION
OF
THREATENED, ENDANGERED, AND SENSITIVE
WILDLIFE

Melvin Butte Vegetation Management Project

Prepared by:

Monty Gregg
District Wildlife Biologist

Author's Signature: _____/s/Monty Gregg_____

Date: _____09/17/15_____

A Biological Evaluation has been prepared in compliance with the requirements of Forest Service Manual (FSM) 2630.3., FSM 2670-2671, FSM W.O. Amendments 2600-95-7, and the Endangered Species Act (ESA) of 1973. A Biological Assessment (BA) was prepared in compliance with the requirements of Forest Service Manual (FSM) 2630.3, FSM 2672.4 and the Endangered Species Act of 1973 (Subpart B: 402.12, Section 7 Consultation, as amended) on actions and programs authorized, funded, or carried out by the Forest Service to assess their potential for effect on threatened and endangered species and species proposed for federal listing (FSM 2670.1).

Species classified as sensitive by the Forest Service are to be considered by conducting biological evaluations (BE) to determine potential effects of all programs and activities on these species (FSM 2670.32). The BE is a documented review of Forest Service activities in sufficient detail to determine how a proposed action may impact sensitive wildlife species, and to comply with the requirements of the Endangered Species Act.

Introduction to Wildlife Effects

The following specialist reports for wildlife, Threatened, Endangered and Sensitive Species (TES), Management Indicator Species (MIS), Birds of Conservation Concern (BCC), and Big Game have been incorporated in their entirety. The Zone of Influence for discussion on cumulative effects is bounded by the project area for all species except Big Game which is bounded on a subwatershed basis. The area of influence includes overlap with existing conditions such as roads, trails, and past management activities.

This section includes discussion on data used, methods, models, general assumptions, evaluation criteria and a summary of effects. General effects are discussed in this section. General effects cover broad categories of species and those effects that are common to all alternatives including the no action alternative.

Recently completed surveys and historical data were used in determination of species occupancy within the Melvin Butte project area. Incidental species observations have also contributed to the knowledge of species presence within the project area and/or Sisters Ranger District. Potentially suitable habitat is considered to be occupied.

ACE Model (Action/Change/Effect)

The long-term sustainability of forest ecosystems and wildlife habitat is dependent on a variety of factors, but the purpose and need of this project identified that due to fire suppression and existing conditions from past management, stands are over-stocked and outside the Historic Range of Variability (HR). HRV is used to determine the desired future condition for wildlife habitat as it relates to each Plant Association group, and what management action is needed for departure from the existing condition to continue to promote future wildlife habitat. Forest thinning and fuels reduction treatments are the two main treatment types that will occur to move stands toward HRV and have the potential to impact existing wildlife habitat in the short-term. Removal of habitat from these management activities could directly or indirectly affect wildlife species and their habitat. An evaluation of the potential effects to wildlife species will be completed for the project to determine if these effects are negative or beneficial.

Duration and Degree of Impacts (Short-Term vs. Long-Term)

Under each action alternative, the project will primarily manipulate vegetation through a variety of thinning techniques. However, stands may also be treated by use of prescribed fire or a combination of thinning and prescribed fire. In addition, some treatments may not directly impact habitat, but could cause disturbance through equipment operation or smoke from prescribed fire. Effects of these treatments to habitat will be assessed as short-term and long-term impacts. Stand Density Index (SDI) is used to measure the risk of a stand's susceptibility to insect and disease as a result of stand densification. From the initial density reduction treatment, effects from the reduction occur roughly over a 30 year period. After 30 years, stands begin to put on basal area growth, height, and begin to recruit new trees into the stands, increasing SDI (Personal Communication Brian Tandy District Silviculturist). To standardize the length of time when referencing short-term and long-term impacts to wildlife habitat from forest thinning, short-term impacts are $\leq$30 years and long-term impacts are those that will occur over $\geq$30years.

Bounding Spatial and Temporal Changes within the Zone of Influence

For this project proposal, activity area boundaries are considered to be the smallest identified area where the potential direct and indirect effects from different management practices could occur. The project area proposes treatments to ponderosa pine, mixed conifer, and lodgepole pine stands within Northwest Forest Plan Matrix Land Allocation on the Sisters Ranger District. A watershed analysis was completed in 2013 to characterize the human, aquatic riparian, and terrestrial features, conditions, processes and interactions (ecosystem elements) within the watershed. The discussion of wildlife cumulative effects will be focused on the units proposed for treatments and their incremental impacts in combination with past, present and reasonably foreseeable project within the Deep Canyon Watershed ("zone of influence"). Only National Forest system lands will be analyzed within the "zone of influence". Chapter 3 of the EA contains a list of past, present and reasonably foreseeable future projects within the Deep Canyon watershed that has the potential to contribute to cumulative effects. However, not all projects on the list impact wildlife or wildlife habitat. Therefore, Table 1 is a subset of the list from Chapter 3 of ongoing and reasonably foreseeable future actions identified as potentially contributing towards cumulative effects to wildlife in the watershed. Habitat for each identified species associated with the project area will be discussed on a forest wide basis to address species viability as it relates to MIS.

Table 1: Ongoing or Reasonably foreseeable actions in the project area and Deep Canyon 10th field watershed

Type of Action	***General Description***	***Status/Timing***	***Acres***
Vegetation Management			
Pole Creek Fire Timber Salvage	*Salvage of fire killed timber*	*Ongoing*	*54 acres*

Pole Creek Fire Hazard Tree Removal	*Felling and Salvage of fire killed danger trees*	*Ongoing*	*350 acres*
Ursus BFR	*Thinning and mastication*	*Reasonably foreseeable*	*5,900 acres*
Bear Wallow Firewood BFR	*Fire wood cutting along the FS Road 4601*	*Ongoing*	*11 miles of road approximately 510 acres*
Bend Municipal Watershed Fuels Reduction BFR	*Hazardous fuels reduction; thinning*	*Reasonably foreseeable*	*12 miles of road approximately 400 acres*
Skyline Forest, BFR	*Salvage of fire killed timber*	*Reasonably foreseeable*	*Approximately 250 acres.*

Northern Spotted Owl

The analysis conducted for the northern spotted owl includes a forest-wide analysis of all nesting, roosting, foraging (NRF) and dispersal habitat, Critical Habitat Units, known home ranges, and late-successional reserves. NRF acres used are derived from the 2014 Programmatic Biological Assessment (BA) update for the 2014 Deschutes and Ochoco Programmatic Biological Assessment and reflect the most current situation. CHU refers to the area reflected in the 2013 update to the Critical Habitat Rule. An analysis of each home range has also been conducted. A 1.2 mile radius circle is used as a home range distance in the Cascade Range. This equates to approximately 2,882 acres.

R6 Sensitive Species

Sensitive species from the R6 Regional Forester's Sensitive Species list (07/13/2015) were only analyzed if they have potential habitat in the project area. Some Sensitive Species are also Management Indicator Species (MIS) identified in the Deschutes National Forest Land and Resource Management plan and were analyzed for the Forest and the project area. Surveys have not been conducted for each species. In some cases, no surveys have occurred and in others, surveys may not have been conducted on a consistent basis. Incidental observations may also contribute to known sitings.

Units of Measure

Suitable habitat for each Sensitive wildlife species that is also considered a Deschutes LRMP MIS species analyzed in this document has been quantified for the project area, the watershed, and at the Forest level. The following measure will be used to evaluate the impacts and associated effects of the planned activities:

- Acres of potentially suitable habitat were calculated by GNN located within the Melvin Butte area and associated watershed (Deep Canyon Watershed) to complete a cumulative effects analysis.
- Potentially suitable habitat was calculated using GNN and Viable at the Forest level to compare project cumulative effects to the watershed with the overall habitat on the forest, to determine effects to habitat viability across the Forest.

Executive Summary

Summary of Effects/Impacts for Threatened, Endangered, and R6 Sensitive Species

The biological evaluation (BE) analyzes the effects to federally threatened, endangered, proposed, and candidate species, and impacts to Region 6 Sensitive Species associated with the Melvin Butte project area on the Deschutes National Forest. Habitat occurs in the project area for two federally listed and one

proposed species, designated northern spotted owl critical habitat, and five Sensitive Species. The following is a summary of the findings of this BE on the effects/impacts of the two action alternatives.

Alternatives 2 and 3 will have ***No effect*** to the federally endangered gray wolf and its habitat.

Alternatives 2 and 3 will have ***No effect*** to the proposed threatened pacific fisher and its habitat.

Alternatives 2 and 3 ***May affect but not likely to adversely effect*** the federally threatened northern spotted owl and its habitat.

Alternatives 2 and 3 ***May affect but not likely to adversely effect*** northern spotted owl designated Critical Habitat.

Alternatives 2 and 3 will have ***No effect*** to the federally threatened Oregon spotted frog and its habitat.

Alternatives 2 and 3 will have ***No effect*** to Oregon spotted frog proposed Critical Habitat.

Alternatives 2 and 3 will have No impact to the Townsend's big-eared bat, fringed myotis, and pallid bat.

Alternatives 2 and 3 May impact but will not lead to a trend towards federal listing for the sensitive white-headed woodpecker and Lewis' woodpecker.

Alternatives 2 and 3 will have **No impact** for the following Sensitive Species due to a lack of habitat: western bumblebee, Johnson's hairstreak, silver-bordered fritillary, Crater Lake tightcoil, evening fieldslug, Columbia spotted frog, wolverine, American peregrine falcon, bald eagle, greater sage grouse, bufflehead, northern waterthrush, harlequin duck, horned grebe, tricolored blackbird, yellow rail, and Tule greater white-fronted goose.

Federally Listed and Proposed Species

The northern spotted owl has habitat in the Melvin Butte project area. A Joint Aquatic and Terrestrial Biological Assessment for Federal Lands within the Deschutes and John Day River Basins Administered by the Forest Service was completed in 2014 (USDA Forest Service 2013) for projects proposed on the Deschutes National Forest during 2013-2016 that may affect but would not likely adversely affect the northern spotted owl. The BA established project design criteria to simplify the consultation process with the U.S. Fish and Wildlife Service (FWS) for projects proposed from 2013 to 2016. The goal for the Forests is to fully implement the criteria to achieve conservation and recovery objectives of federally listed, proposed, and candidate species. Project design criteria are used as sideboards for the planning process and include effects from habitat alteration and noise disturbance. Two additional listed species are also included in this BE: the endangered gray wolf and the North American wolverine which was proposed for listing as a threatened species in February 2013. Table 2 lists these species, their habitats, and potential effects.

Table 2: Federally listed and proposed species under the Endangered Species Act.

Federally Listed and Proposed Species under the Endangered Species Act				
Species	**Status**	**Habitat**	**Habitat/ Presence in Project Area**	**Effect**
Gray wolf (*Canis lupus*)	Federal Endangered	Any plant association	No denning or rendezvous habitat; low	No Effect

		group	potential for dispersal habitat	
Pacific fisher (Martes pennanti)	Proposed Threatened	Mixed forests, High Elevation	No habitat	No Effect
Northern spotted owl (*Strix occidentalis caurina*)	Federal Threatened, MIS	Old growth mixed conifer forests	Nesting, roosting, and foraging habitat (NRF), dispersal in project boundary	May Effect NLAA
Northern spotted owl (*Strix occidentalis caurina*) Critical Habitat	Federal Threatened, MIS	Old growth mixed conifer forests	Nesting, roosting, and foraging habitat (NRF), dispersal habitat, and designated critical habitat within project boundary	May Effect NLAA
Oregon spotted frog (Rana pretiosa)	Federal Endangered	Shallow lakes, ponds	No habitat	No Effect
Oregon spotted frog (Rana pretiosa) proposed Critical Habitat	Federal Endangered	Shallow lakes, ponds	No habitat	No Effect

Gray wolf

Measure: Effects to denning habitat, rendevous sites, and dispersal habitat

Existing Condition

The gray wolf usually occurs in forested habitats with some open areas such as river valleys and meadows for hunting prey including pronghorn, deer and elk, and smaller mammals. Wolf packs (usually 5-10 animals) can have very large territories—up to 400 square miles or larger. Key wolf habitat components identified in the 1987 Wolf Recovery Plan (USDI Fish and Wildlife Service 1987) include: "1) a sufficient, year-round prey base of ungulates and alternative prey, 2) suitable and somewhat secluded denning and rendezvous sites, and 3) sufficient space with minimal exposure to humans. Den sites are excavated areas in the soil but hollow logs, beaver lodges, the base of hollow trees, pit excavations, and rock caves, usually near water, are also used. Rendezvous sites are the activity sites used after the denning period and prior to the nomadic hunting period of fall and winter. They are often in open grassy areas near water or at forest edges."

The project area does not contain habitat for denning or rendezvous sites. There are no known wolf packs on the Deschutes National Forest. The closest known packs occur on the Umatilla National Forest in northeastern Oregon. Habitat for wolf prey species (elk and mule deer) is limited in the project area.

In Oregon, the gray wolf is listed as federally endangered in areas west of Highways 395, 78, and 95 which includes the Deschutes National Forest. In 2011, a single male gray wolf was documented dispersing through the southern portion of the Deschutes National Forest and subsequently traveled south into California. In 2012, it was documented traveling back and forth across the California/Oregon southern border and has established a pack in southern Oregon on the Rogue Siskyou National Forest.

Alternative 1 (No Action)—Ecological Trends

Under the No Action Alternative, no treatments will be prescribed within Melvin project area (5,375 acres). However, the "ecological trend" in the short-term is that these stands would continue to remain suppressed and at risk of a stand-replacing wildfire. Development of future old growth within ponderosa pine and mixed conifer stands would be prolonged and the old trees within the stands would continue to be stressed, decreasing their longevity. However, stands would continue to provide habitat for ungulate populations that provide the main prey base for the gray wolf. In the long-term, if a stand replacing wildfire or insect outbreak hasn't occurred, the stands containing disease would continue to die and the multi-storied structure would diminish along with any remnant old growth trees, providing a very discontinuous overstory and lacking suitable cover and forage across the project area for ungulates.

Direct and Indirect Effects—Alternatives 2 and 3

There are no know gray wolf packs associated with the Melvin Butte project area or the Deschutes National Forest therefore there are no direct effects associated with the action alternatives.

All action alternatives provide some level of thinning, mowing and burning in the Melvin Butte project area. Thinning will open up stands reducing crown closure, promoting the development of herbaceous plants in these areas. Thinning treatments have the potential to provide a future forage base to prey species of the wolf, such as snowshoe hare, deer, and elk. Therefore, there is No Effect to the gray wolf but could be beneficial to prey habitat under Alternative 2 or Alternative 3.

The following Table displays the total acres of thinning from below and fuels treatments that will enhance habitat for gray wolf prey by alternative.

Table 3: Acres of thinning and fuels treatments by alternative

Alt. 2	Alt. 3
3,808 acres	3,808 acres

Project Design Criteria/Mitigation Measures—Alternatives 2 and 3

None.

Cumulative Effects— Alternatives 2 and 3

All action alternatives have the potential to enhance habitat for gray wolf. There are no negative effects associated with the alternatives. Implementation of Alternatives 2 and 3 will have no cumulative effects to the gray wolf and their habitat.

Conclusion—Alternatives 2 and 3

There are no direct or indirect effects to the gray wolf or its habitat under Alternatives 2 or 3. There are no ongoing and reasonably foreseeable cumulative effects to the gray wolf. There would be ***No Effect*** to the gray wolf but could be beneficial to prey habitat under either Alternative 2 or 3 for the Melvin Butte project.

Pacific Fisher, Proposed Threatened, Region 6 Sensitive

Measure: Effects to denning habitat and dispersal habitat

Existing Condition

The Pacific fisher primarily uses mature, closed-canopy coniferous forests with some deciduous component, frequently along riparian corridors (Csuti et al. 2001). In Ruggiero et al. (1994), it is suggested fishers prefer closed-canopy (greater than 60%), late-successional forests with large physical structures (live trees, snags, and logs), especially if associated with riparian areas. A 2004 Species Assessment by the US Fish and Wildlife Service documents key aspects of fisher habitat as those associated with late-successional forests (i.e. high canopy closure, large trees and snags, large logs, hardwoods, and multiple canopy layers). Distribution of fishers is limited by elevation and snow depth (Krohn et al. 1997 *in* US Fish and Wildlife Service Species Assessment). Fishers generally avoid areas of high human disturbance, primarily high road density or recreational developments. Fishers are fairly large, weighing 3 to 13 lbs and 29 to 47 inches long. This may suggest a need of larger log sizes for dens than other animals with similar needs (e.g. marten). Aubry and Raley (2006) found in southwestern Oregon, fishers were found denning and resting at 4,000 feet elevation, more than 80% canopy closure, and more than 16 snags and 67 logs at least 20" DBH per acre; supporting the suggestion that this species utilizes large to very large structure. Denning and resting sites were also observed in large live trees (mostly Douglas-fir) with mistletoe brooms, limb clumping, rodent nests, or some other deformity. They also found fishers were preying upon woodpeckers, jays, grouse, quail, squirrels, hare, porcupine, and skunks. Most of these prey species can be found in the watershed.

No habitat occurs for this species in the Melvin Butte project area therefore no further analysis is required.

Northern Spotted Owl, Federally Threatened, MIS

Measures:

(1) Effects to nesting, roosting, and foraging habitat
(2) Effects to dispersal/connectivity habitat
(3) Effects to critical habitat primary constituent elements

Existing Condition

The project occurs within the range of the northern spotted owl. Spotted owls are primarily inhabitants of old growth and mature forests. Suitable spotted owl habitat contains adequate quantities of dead and down woody material, decadent trees, a medium to high crown closure, multiple layers in the overstory, and trees at least 200 years old or greater than 32 inches dbh (USDA Forest Service and USDI Fish and

Wildlife Service 1990). Functional nesting, roosting, and foraging (NRF) habitat for the spotted owl on the Deschutes National Forest includes stands of mixed conifer, ponderosa pine with white fir understories, and mountain hemlock with subalpine fir. The canopy cover is typically greater than or equal to 40% with an overstory comprised of at least five percent of trees greater than 21 inches diameter-at-breast- height (dbh). Habitat that meets NRF requirements also provides foraging habitat, although a wider array of forest types are used for foraging, including more open and fragmented habitat.

Suitable nest sites are generally in cavities in the boles of either dead or live trees. Platform nests may also be used (but more rarely), which include abandoned raptor nests, broken treetops, mistletoe brooms, and squirrel nests. Relatively heavy canopy habitat with a semi-open understory is essential for effective hunting and movement.

Habitat conditions that support good populations of northern flying squirrels (*Glaucomys sabrinus*), western red-backed voles (*Clethrionomys californicus*), and other nocturnal or crepuscular small mammals, birds, and insects are essential to supporting spotted owls. An analysis of local spotted owl pellets showed the primary prey species on the Deschutes National Forest is the northern flying squirrel with red-backed vole, bushy-tailed woodrat (*Neotoma cinerea*), western pocket gopher (*Thomomys mazama*), Douglas squirrel (*Tamiasciurus hudsonicus*), snowshoe hare (*Lepus americanus*), voles (*Microtus spp.*), mice (*Peromyscus spp.*), and insects as secondary prey items.

Flying squirrels were once thought to be old-growth dependent but several studies have shown that densities were similar in both young and old forests, especially if old forest legacies (e.g. large decaying logs) and well-developed understories were present (Rosenberg and Anthony 1992, Carey 1995, Waters and Zabel 1995, Carey et al. 1997, Carey 2000, Carey et al. 2002, and Ransome and Sullivan 2003). Den sites have been documented in cavities in live and dead old growth trees, stick nests, moss nests, cavities in branches of fallen trees, decayed stumps, and suppressed young trees (Carey et al. 1997). Mychorrizal and epigeous fungi, in particular truffles, are an important food source for flying squirrels (Waters and Zabel 1995, Waters et al. 2000, Carey et al. 2002, and Lehmkuhl et al. 2006a) but where winter snow levels are deeper, as seen in eastside habitats more often, other foods become important such as lichens (Rosentreter et al. 1997, and Lehmkuhl et al. 2006a).

Carey et al. (1997) specifically studied dens of the northern flying squirrel. They found the majority of dens were in live trees. They recommend that management for northern flying squirrels include leaving large fallen trees, large diameter tall stumps, and large green trees with platform branching, multiple tops and/or cavities. While retaining snags in burned areas is important to provide options for the flying squirrel, retaining all snags is not. Developing closed canopy stands to provide habitat may be more important following a fire.

Legacy retention (snags and coarse woody debris) is important to prey species following a disturbance (Courtney et al. 2004). Legacy materials left on site increase the complexity of the environment of young stands by increasing horizontal and vertical structure, which provides for greater prey species diversity (Carey and Harrington 2001). Carey and Johnson (1995) suggest conservation of some coarse woody debris, woody plant species diversity, and understory promotion to enhance biodiversity for prey species. Carey (1995) recommends a range of snags from 2.8 to 8.1 snags per acre >21 inches dbh along with well-distributed patches of dense shrubs for high densities of flying squirrels. The legacy retention can accelerate habitat development for spotted owls and their prey.

Consultation History

Level 1 review streamlining was initiated on August 8, 2013 with a discussion of the project effects to spotted owl designated critical habitat. Jennifer O'Reilly Wildlife Biologist with the FWS, Lauri Turner, Deschutes National Forest Wildlife Biologist, and Monty Gregg (Sisters Ranger District Wildlife Biologist) discussed the project and proposed actions. A rationale for determination of effects to spotted

owl primary constituent habitat elements in designated critical habitat was discussed at the time. A Biological Assessment was submitted on February 24, 2015 and a Letter of Concurrence was received from the U.S. Fish and Wildlife Service on March 5, 2015.

2011 Revised Recovery Plan for the Northern Spotted Owl

The Revised Recovery Plan for the Northern Spotted Owl (Recovery Plan) was approved on June 28, 2011 (USDI Fish and Wildlife Service 2011). The Recovery Plan states that many populations of spotted owls continue to decline, especially in the northern parts of the subspecies' range, even with extensive maintenance and restoration of suitable habitat. Managing sufficient habitat for the spotted owl now and into the future is important for its recovery. However, it is becoming more evident that securing habitat alone will not recover the spotted owl. Based on the best available scientific information, competition from the barred owl (*Strix varia*) poses a significant and complex threat to the owl. Past and current habitat loss are also threats to the spotted owl, even though loss of habitat due to timber harvest has been greatly reduced on Federal lands over the past two decades (USDI Fish and Wildlife Service 2011).

The Recovery Plan recognizes the extremely complex nature of management of spotted owl habitat in dry forests. It recommends that the dynamic, disturbance-prone forests of the eastern Cascades, California Cascades and Klamath Province be actively managed to meet overlapping goals of spotted owl conservation, responds to climate change, and restores dry forest ecological structure, composition and processes, including wildfire and other disturbances (III-20). The intent of the Recovery Plan is " …to embed spotted owl conservation and recovery within broader dry forest ecosystem restoration efforts to increase the likelihood spotted owl habitat will remain on the landscape longer and develop as part of this fire adapted community instead of being consumed by uncharacteristic wildfires." (III-32). On page III-34 of the Recovery Plan, the FWS provides the following principles for dry forest restoration treatments:

- Emphasize vegetation management treatments outside of spotted owl core areas or high value habitat where consistent with overall landscape project goals;
- Design and implement restoration treatments at the landscape level;
- Retain and restore key structural components, including large and old trees, large snags and downed logs;
- Retain and restore heterogeneity within stands. (Fine scale mosaic);
- Retain and restore heterogeneity among stands. (Meso-scale mosaic); and
- Manage roads to address fire risk: use wildfires to meet vegetation management objectives where appropriate.

2013 Designated Critical Habitat

The final rule for critical habitat designation was released on December 4, 2012 and became effective on January 3, 2013 (USDI Fish and Wildlife Service 2012). Critical habitat was revised in 2013 after the 2008 Critical Habitat designation was challenged in court. The FWS encourages land managers to consider implementation of forest management practices recommended in the Revised Recovery Plan to restore natural ecological processes where they have been disrupted or suppressed and the application of "ecological forestry" management practices within critical habitat to reduce the potential for adverse impacts associated with commercial timber harvest when such harvest is planned within or adjacent to critical habitat. The FWS encourages land managers to consider the conservation of existing high quality northern spotted owl habitat, the restoration of forest ecosystem health, and the ecological forestry management practices recommended in the Revised Recovery Plan that are compatible with both the goals of spotted owl recovery and Standards and Guidelines of the Northwest Forest Plan. In fire-prone

forests east of the Cascade crest, it is recognized that vegetation and fuels management may be appropriate both within and outside designated critical habitat where the goal of such treatment is to conserve natural ecological processes or restore processes such as fire where they have been modified or suppressed.

Critical habitat is defined in section 3 of the Act as (50 CFR Part 17 p. 71896):

- The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features
- Essential to the conservation of the species and
- That may require special management considerations or protection and
- Specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species

Physical and Biological Features

Physical and biological features (PBFs) are essential to the conservation of the species and may require special management considerations or protection. Physical or biological elements of habitat include but are not limited to (50 CFR Part 17 p. 71897):

- Space for individual and population growth and for normal behavior
- Food, water, air, light, minerals, or other nutritional or physiological requirements
- Cover or shelter
- Sites for breeding, reproduction, and rearing (or development) of offspring
- Habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species

For the northern spotted owl, physical or biological features essential to the conservation of the species are forested areas that are used or likely to be used for nesting, roosting, foraging, and dispersing. The specific characteristics or components that comprise these features include, for example, specific ranges of forest stand density and tree size distribution, coarse wood debris, and specific resources, such as food, nest sites, cover, and other physiological requirements of spotted owls and considered essential to the conservation of the species.

Primary Constituent Elements

For the northern spotted owl, primary constituent elements (PCEs) are specific characteristics that make areas suitable for nesting, roosting, foraging, or dispersal habitat. To be essential to the conservation of the northern spotted owl, features need to be distributed in a spatial configuration that's conducive to persistence of populations, survival, and reproductive success of resident pairs and survival of dispersing individuals until they can recruit into a breeding population. There are 4 PCEs: (1) a forest type in early, mid, or late seral stages and that supports the owl across its geographical range; (2) habitat that provides for nesting and roosting; (3) foraging habitat; and (4) habitat to support the transience and colonization phases of dispersal. The PCE #1 (forest type) must be in concert with at least one other PCE to be critical habitat.

The Melvin Butte project area does not provide NRF habitat for the spotted owl because canopy closure and stand structure does not exist to provide NRF habitat. Existing stands do not provide adequate cover

or shelter for owl or their prey (flying squirrels) and sites for breeding, reproduction, and rearing (or development) of offspring. Due to the amount of insects and disease in the stands, canopies are very fragmented and disjunct and do not provide canopy closure and contiguous overstory large tree structure needed for nesting and roosting, foraging (prey habitat). The Melvin Butte project area does support the transience and colonization phases of dispersal and therefore provides the minimum stand requirements to provide the security needed for dispersing birds through the project area. The Melvin Butte project area provides the PCEs for dispersal habitat.

Critical Habitat on the Deschutes National Forest

Critical habitat delineation on the Deschutes National Forest does not occur in a contiguous fashion but is instead mapped as two separate critical habitat units (CHUs) across the three ranger districts. The Deschutes National Forest lies primarily in CHU #7. In addition, there is a small portion of CHU #6, West Cascades South, on the southern end of the Deschutes National Forest on the Crescent Ranger District. Table 4 lists the acres in the CHUs and percentage of the CHUs that occur on the Deschutes National Forest. There are 250,056 acres of CHU #7 and 3,264 acres of the CHU #6 on the Deschutes National Forest.

Table 4: Acres of critical habitat units 6 and 7 on the Deschutes National Forest.

Critical Habitat Unit	Total Acres of Critical Habitat Unit	Total Acres of Critical Habitat Unit on Forest	Percent of Total CHU the Forest Occupies
Unit 7 – East Cascades North	1,345,523	250,056	18.5%
Unit 6 – West Cascades South	1,355,198	3,274	<1%
Total	2,700,721	253,321	19%

The critical habitat units are further divided into subunits. Three CHU subunits occur on the Deschutes National Forest: ECN 8, ECN 9, and WCS 5. Subunit ECN 8 is entirely on the Sisters Ranger District and Subunit WCS 5 is entirely on the Crescent Ranger District. Subunit ECN 9 lies on both the Bend-Fort Rock and Crescent Ranger Districts. It falls between the other two subunits on the Deschutes National Forest and therefore is important in providing north/south connectivity of habitat along the eastern range of the species. Connectivity within and between critical habitat subunits is necessary to provide demographic support and genetic diversity should fire, insects, disease, wind storms, and/or inclement weather significantly reduce the population in any individual subunit. Table 5 lists the number of acres in the critical habitat subunits on the Deschutes National Forest.

Table 5: Critical habitat subunits on the Deschutes National Forest. The ECN 8 subunit occurs wholly on the Sisters Ranger District.

Critical Habitat Unit (CHU) Name	CHU Number	CHU Subunit	Total CHU Acres	Total CHU Acres on Forest lands	Total CHU Acres on Private lands	Total CHU Acres on Forest lands	Percent of CHU on Forest lands
East Cascades North	**07**	**ECN 8**	**94,622**	**94,517**	**106**	**94,622**	**100%**
East Cascades North	07	ECN 9	155,434	155,405	30	155,434	100%
West Cascades South	06	WCS 5	356,415	3,274	0	3,274	<.92%
		Total	606,471	253,196	136	253,330	

Status of the Spotted Owl Including Barred Owl Detections in Subunit ECN 8

Subunit ECN 8 consists of approximately 94,622 acres in Jefferson and Deschutes counties of Federal lands managed by the Forest Service under the NWFP. Of the 94,622 acres, approximately 94,517 acres occur on the Deschutes National Forest while the remaining 106 acres occur on private lands.

Special management considerations or protection are required in this subunit to address threats from current and past timber harvest, losses due to wildfire and the effects on vegetation from fire exclusion, and competition with barred owls. This subunit is expected to function primarily for demographic support to the overall population, as well as north-south connectivity between subunits. It was determined that all of the unoccupied and likely occupied areas in this subunit are essential for the conservation of the species to meet the recovery criterion that calls for the continued maintenance and recruitment of northern spotted owl habitat. The increase and enhancement of northern spotted owl habitat is necessary to provide for viable populations of spotted owls over the long term by providing for population growth, successful dispersal, and buffering from competition with the barred owl.

This subunit is divided into four areas: Green Ridge, Meadow Lakes, Bluegrass Butte, and Trout. The Green Ridge area lies at the north end of the forest on the Sisters Ranger District and runs north-south along Green Ridge, wrapping around Black Butte and Suttle Lake running north to Brush Creek. It is bounded on the west by the Mt. Jefferson wilderness and on the north by the Warm Springs Reservation. This area excludes the Metolius Basin and overlaps portions of the Metolius and Cache Late Successional Reserves. The Meadow Lakes area is small and is centered around Link and Meadow Lakes on the Sisters Ranger District and does not overlap any LSR. Bluegrass Butte is a small area bounded on the west by both the Mt. Washington and Three Sisters wilderness areas. Highway 242 runs through the center and the Belknap Crater lava flow is excluded. It overlaps a portion of the Cache and Trout LSRs. The Trout area is bounded on the west by the Three Sisters wilderness and on the east by the NWFP line. It overlaps a portion of the Trout LSR.

Approximately 15% of the subunit is classified as NRF habitat (13,964 acres) and NRF is generally distributed throughout with the majority of habitat in the eastern half of the Green Ridge and Bluegrass Butte areas. The majority of the remaining habitat is considered dispersal habitat with the exception of the stand- replacement and mixed mortality fire areas. The major plant associations are white fir with moderate amounts of Douglas-fir, mountain hemlock, Pacific silver fir, and ponderosa pine (Table 6).

Table 6. PAG acres within Critical Habitat Subunit ECN 8 on the Deschutes National Forest.

PAG	Acres in PAG	% of PAG
Douglas Fir	11,643	12%
Grand Fir	120	<1%
Lodgepole Pine	0	0%
Mountain Hemlock	5,872	6%
Pacific Silver Fir	1,808	2%
Parkland	190	<1%
Pinyon-Juniper	92	<1%
Ponderosa Pine	2,425	3%
Subalpine Fir	66	<1%
Western Hemlock	283	<1%
White Fir	72,124	76%
Grand Total	**94,622**	**99%**

Approximately three-quarters (76%) of this subunit is comprised of the white fir PAG that has the potential to provide suitable spotted owl habitat in the appropriate plant associations. The mountain

hemlock PAG does not have the complex structure needed to provide suitable spotted owl habitat and the ponderosa pine PAG is usually too dry and open to produce suitable habitat. However, due to fire suppression, understories have grown in producing short-term marginal NRF habitat and dispersal habitat in some locations. This occurs across the subunit where large trees can be produced but due to the overstocked nature of the stands, they are at high risk of loss from insects, disease, and/or wildfire that has occurred frequently on the Sisters Ranger District over the last 20 years.

Several wildfires have occurred partially or wholly in this subunit since 2002: Cache Mtn. (2002), Eyerly (2002), RNA (2002), Link (2003), B&B (2003), Black Crater (2006), Lake George (2006), GW (2007), Summit Springs (2008), Wizard (2008), Black Butte II (2009), Shadow Lake (2011), Pole Creek (2012), Green Ridge (2013), and Bridge 99 (2014). Over 38,800 acres (41%) of this subunit have been impacted by fire (Table 7).

Table 7: Vegetation mortality due to wildfire in ECN 8 on the Deschutes National Forest.

Acres of Low Mortality	Acres of Mixed Mortality	Acres of Stand Replacement	Total Acres
17,874	10,927	10,064	38,865

Mixed mortality and stand replacement burns generally result in the loss of NRF habitat and potential dispersal habitat if the majority of stands are comprised of true firs such as white fir. Low mortality areas are generally underburned and dispersal habitat is likely to be retained in these areas. In addition, significant insect and disease outbreaks have occurred within this subunit, most of which has been impacted by wildfire. A mountain pine beetle epidemic has impacted lodgepole pine stands in and adjacent to the Trout Creek area. As a result, approximately 90% of the lodgepole pine has been killed. This has led to the degradation of mixed conifer stands, primarily a reduction in canopy cover due to the loss of lodgepole pine. These white fir stands also contain significant levels of dwarf mistletoe which has resulted in canopy closure reductions as well and has left the area fragmented.

This subunit is expected to function primarily for demographic support to the overall population, as well as north-south connectivity between subunits. Connectivity exists down Green Ridge to Black Butte and occurs across Metolius Basin through ponderosa pine stands but becomes limited along the eastern slope of the Cascades as a result of wildfire. Impacts from large wildfires can be seen from the base of Mt. Jefferson south along the east slope of the Cascades to Three Creek Lake. The majority of these fires ranged from high elevation wilderness through the mid-slope regions where the majority of historic spotted owl home ranges were found. In addition, mortality has occurred within the high elevation lodgepole pine stands within the wilderness from the mountain pine beetle. Impacts from this outbreak occur from roughly Trout Creek Butte area south to Cultus Mountain on the Bend-Ft. Rock Ranger District. Impacts from fire and insects have limited north-south connectivity on the Sisters Ranger District primarily. Dispersal habitat occurs in the lower elevations primarily in overstocked ponderosa pine stands which are also at risk of loss. This subunit is still providing demographic support but at a reduced level due to impacts from past wildfires. In stand replacement and mixed mortality areas, it may take >300 years to produce suitable NRF habitat and >100 years to produce dispersal habitat due to the lack of a seed source for desired tree species (USDA Forest Service 2004a). In underburned areas, habitat is likely to be produced in 25-50 years and NRF in approximately 100 years due to the remaining residual trees.

Eight known spotted owl home ranges are found partially or wholly in ECN 8 subunit and all are considered viable. The Castle Rocks, Trout Creek, Davis Creek, and Bluegrass Butte home ranges have not been surveyed in the past 2 to 3 years and the site status is unknown. One additional pair, Black Crater, has been surveyed over the past two years but no birds have been detected.

In 2011, a new pair (Metolius Basin) was detected. This pair has not been found to be reproductive. In 2013, a new pair was detected (Meadow Creek). The reproductive status of this pair has not yet been determined.

Eight barred owl detections have occurred in this subunit since 1999. Two barred owl pairs have been documented with one pair found on the north end of Green Ridge near the Metolius Basin spotted owl pair and the other barred owl pair is associated with the north side of Black Butte (near the Obsidian spotted owl home range). A single barred owl was detected near Six Creek in 2012. Barred owls have not been detected Deep Canyon watershed associated with the Melvin Butte project area.

Subunit ECN 8 also overlaps four NWFP allocations – LSR, matrix, congressionally reserved, and administratively withdrawn. Late-successional reserves have the objective to protect and enhance conditions of late-successional and old growth ecosystems, which serve as habitat for late-successional and old growth forest related species including the spotted owl. Administratively withdrawn lands include recreation and visual areas, back country and other areas where management emphasis precludes scheduled timber harvest. Matrix is the area where most timber harvest and other silvicultural activities will be conducted. None of the proposed treatment units occur within an LSR allocation.

Table 8 lists the mapped critical habitat acres at different spatial scales. There are 253,196 acres of critical habitat on the Deschutes National Forest and 94,517 acres of Subunit ECN 8. Within the analysis boundary of the Melvin Butte project area, there are approximately 3,731 acres of critical habitat mapped in the ECN 8 subunit. Approximately 2,971 acres of Melvin Butte vegetation management units occur in critical habitat.

Table 8: Mapped critical habitat that overlaps with the Melvin Butte project area.

	Acres of mapped critical habitat on the Deschutes National Forest	Percent (%) of Acres
CHU 7 on the Deschutes National Forest	253,196	100%
Subunit ECN 8 on the Deschutes National Forest	94,517	37% of CHU
Melvin Butte Project Area Boundary	3,731	4% of subunit
Melvin Butte Vegetation Management units	2,971 acres	3% of subunit
		1% of CHU on Forest

NRF Habitat Within Critical Habitat and the Project Area

Elevation and corresponding changes in temperature or moisture regimes constrain the development of vegetation communities selected by spotted owls, and may exceed the bounds of physiological tolerance of spotted owls or their prey. In addition, topography influences the distribution of spotted owl habitat and patterns of habitat selection. The effects of topography are strongest in drier forests, where aspect and insolation (amount of solar radiation received in an area) contribute to moisture stress that can limit forest density and tree growth. In drier forests east of the Cascades, suitable habitat can be concentrated at intermediate topographic positions, on north-facing aspects, and in concave landforms that retain moisture. This leads to a distribution of suitable habitat characterized by ribbon-like bands and discrete patches. Ribbons occur along drainages and valley bottoms, along the north faces of ridges that trend from east to west, and at intermediate topographic positions between drier pine-dominated forests at lower elevations, and subalpine forest types at higher elevations. Discrete patches also occur on top of

higher plateaus. The majority of suitable spotted owl NRF habitat as well as historic and current spotted owl home ranges occur within the mid-elevational mixed conifer (white fir PAG) band on the Deschutes National Forest. This band includes the east slope of the Cascades and buttes, especially on the southern half of the forest. Approximately 56% of the NRF habitat on the Deschutes National Forest occurs within designated critical habitat and a large portion of the NRF occurring outside critical habitat is located within wilderness.

Stand composition and structure associated with NRF habitat varies greatly from north to south across ECN 8 and across the Sisters Ranger District. Although elevation, corresponding temperature, and moisture regimes influence the vegetation communities, these factors coupled with soil types also greatly influence vegetation communities across the Sisters Ranger District. The soil types north of Highway 242 (primarily associated with the Metolius Basin and Green Ridge) are more highly productive than the soil types on the southern end of the district, south of Highway 242. As a result, the northern end of the district and northern portions of ECN 8 have a more diverse stand composition in the mid-elevation mixed conifer PAG's. This mixed conifer PAG s contains an overstory of predominantly Douglas-fir and ponderosa pine both long-lived and fire tolerant. In addition, this PAG also contains incense cedar, western larch, and western white pine, which are also long-lived fire tolerant species. Lastly, white-fir is a short live species that is very susceptible to insects and disease and dominates the understory. Due to these highly productive soils associated diverse vegetation communities, the majority of the historic NRF habitat and historic spotted owl territories occurred north of Highway 242 on the north end of the district.

South of Highway 242 in the southern portion of the Sisters Ranger District, ECN 8, and within the Melvin Butte project area, NRF habitat in mid-elevational mixed conifer is similar to the rest of the Deschutes National Forest. Due to the lower site productivity associated with the southern end of the district, these mid-elevation mixed conifer (white fire) PAG's have very limited species composition. Ponderosa pine is the primary long-lived fire tolerant species in the overstory. White fir dominates the understory and secondarily lodgepole pine, both of which are fire intolerant and highly susceptible to insects and disease. As a result, very little NRF habitat historically and currently occurs in the southern portion of the district as well as southern ECN 8. Due to the lack of stand diversity, NRF habitat is limited in this area, as well as historic nesting territories. In addition, with the last 100 years of fire exclusion and without harvest, these stands continue not to develop into NRF habitat. Typically the white fir and lodgpole pine die from insects and disease before they are able to develop into large overstory trees contributing to high crown closures and large tree structure.

Differences in mixed conifer vegetation composition across the Sisters Ranger District may be explained by changes in landscape geomorphology and soils across from north to south. Land Type Association (LTA) mapping which characterizes different landscapes at large scales can be useful for displaying these differences (US Forest Service). LTA mapping separates out large landforms based on differences in ecological drivers including geomorphology and soils which in turn influence different soil/climatic zones at a landscape scale. LTA's identified for the mixed conifer zone in the western portion of the District, including areas of Metolius Basin and lower to mid flanks of the Cascade Range are identified primarily as ashmantled glacial valleys and ashmantled glaciofluvial fans. Glacial till and glacial outwash in the lower soil profile of these landforms result in low water permeability. The result is a perching of much of the soil water in the upper soil profile and making it available for plant use. Mixed conifer vegetation in the areas of Green Ride in the northeast portion of the District include areas identified as ashmantled low mountains on which ash deposits occur over dense volcanic tuffs and non-fractured rock. Similar to the Metolius Basin soils these materials also help to hold soil moisture for longer periods in the upper soil profile. Landforms in the southern portion of the Ranger District and Melvin Butte project area differ from the north in that they include landforms primarily identified as ashmatled volcanos, ashmatled flows, ashmantled volcanic plains. Soils on these landforms consist of volcanic ash mantles over highly fractured volcanic rock. The result is lower water supplying capacities for vegetation growth due to more water moving through the soil profile into the fractured rock below the plant rooting zone.

Overall, the largest impact to NRF habitat and spotted owl territories across the Sister Ranger District has been wildfire. Since 2002 approximately 144,110 acres has burned or 44% of the district. The majority of these fires have been in the mid-elevation mixed conifer stands.

Table 9 lists the acres of NRF habitat at these different spatial scales. Of the 70,108 acres of NRF habitat on the Deschutes National Forest, approximately 13,964 acres of NRF occur in Subunit ECN 8. The Melvin Butte Project area lies in the southern portion of ECN 8 on the eastern edge of the northern spotted owl's range.

Of the 5,375 acre Melvin Butte project area, approximately 3,731 acres are associated with CHU Subunit ECN 8. NRF habitat identified through a forest wide mapping process underwent field review during the 2011 field season. It was determined during field review that the mapped NRF did not contain adequate stand characteristics to qualify as viable NRF habitat. In addition, to further validate that the lack of suitable stand characteristics in mapped NRF, surveys were completed to protocol from 2009 to 2011 and no responses were detected within the Melvin Butte project area. There is no NRF habitat associated with the project area or with the portion of the project area associated with the CHU.

Table 9: Nesting, roosting, and foraging habitat in critical habitat and the Melvin Butte Project area.

Scale	Acres of NRF Habitat
Deschutes National Forest	70,108
Critical Habitat Subunit ECN 8	13,964
Melvin Butte Project Area Boundary	0
Melvin Butte Vegetation Management Units	0
Percentage of NRF Habitat Affected by Melvin Butte Project	0%

Dispersal Habitat and Connectivity

Northern spotted owls regularly disperse through highly fragmented forested landscapes. Corridors of forest through fragmented landscapes serve primarily to support relatively rapid movement through such areas, rather than colonization or residency of nonbreeding owls. During the transience or movement phase, dispersers use mature and old-growth forest slightly more than its availability; during the colonization phase, mature and old-growth forest is used at nearly twice its availability. Closed-sapling sawtimber habitat is used roughly in proportion to availability in both phases and may represent the minimum condition for movement. Spotted owls can also disperse successfully through forests with less complex structure, but risk of starvation and predation likely increase with increasing divergence from the characteristics of suitable habitat. The suitability of habitat to contribute to the successful dispersal of spotted owls is likely related to the degree to which it ameliorates heat stress, provides abundant and accessible prey, limits predation risk, and resembles habitat in natal territories. Dispersal habitat is essential to maintaining stable populations by promoting rapid filling of territorial vacancies when resident spotted owls die or leave their territories, and to providing adequate gene flow across the range of the species. Generally, dispersal habitat across the Deschutes National Forest is fragmented by roads, timber harvest units, or by areas that have been burned or defoliated by insects or disease but is found from the low ponderosa pine areas to the mountain hemlock zone in varying degrees of quality.

Dispersal habitat was defined by the Interagency Scientific Committee (USDA Forest Service and USDI Fish and Wildlife Service 1990) as stands with an average dbh of 11 inches and a 40% canopy cover. Those conditions are not biologically possible in all eastside plant association groups. In 1996, the Forest conveyed a Science Team of experts on local conditions to determine plausible definitions of dispersal habitat. The team developed a process by which local biological knowledge of sites would be used to describe dispersal habitat (USDA Forest Service 1996). Table 10 lists the following criteria used to define dispersal habitat on the Deschutes National Forest.

Table 10: Dispersal habitat definitions.

Plant Association Group	Stand Criteria Average dbh, Percent Canopy Cover (CC)
Mixed Conifer Wet	11" dbh, 40% CC
Mixed Conifer Dry	11" dbh, 30% CC
Ponderosa Pine	11" dbh, 30% CC
Lodgepole Pine	7" dbh, 30% CC
Mountain Hemlock	7" dbh, 30% CC

Based on the criteria identified in the previous table, an analysis was completed and dispersal habitat was mapped for the entire Deschutes National Forest. Table 11 lists the acres of dispersal habitat at different spatial scales. Of the 289, 552 acres of Dispersal habitat on the Deschutes National Forest, approximately 24,342 acres of NRF occur in Subunit ECN 8. The Melvin Butte Project area lies in the southern portion of ECN 8 on the eastern edge of the northern spotted owl's range. Approximately, 2,796 acres of dispersal habitat exists across the Melvin Butte project area.

Table 11: Dispersal habitat in critical habitat and the Melvin Butte Project area.

Scale	Acres of Dispersal Habitat
Deschutes National Forest	289,552
Critical Habitat Subunit ECN 8	13,964
Melvin Butte Project Area Boundary	2,796

Connectivity in ECN 8 is highly fragmented due to the amount of fires and past timber harvest that have occurred across the Sisters Ranger District. ECN 8 was deliniated in 2011 and Critical habitat was officially designated in in 2013. Although ECN 8 is associated with many fires, during the delineation, areas with the highest fire severity were avoided. Since 2011, the Green Ridge, Pole Creek, and Bridge 99 fires all have continued to impact and fragment ECN 8.

The Pole Creek fire is directly adjacent to the Melvin Butte project and has been the largest fire on the District since 2011. The Pole Creek fire burned approximately 26,795 acres and heavily fragmented the southern portion of ECN 8.

As part of the overall project design for dispersal habitat and to meet the intent of the purpose and need of the project, a retention strategy was developed for spotted owl dispersal habitat. The primary objective of the retention strategy is to provide connectivity for spotted owls in a north to south continuum throughout the project area by retaining dispersal habitat. The retention strategy is based on the inherent soil quality and stand productivity, where the project retains more untreated stands in areas that have high site productivity and contain the most contiguous acres of dispersal habitat. The project was broken into 3 major soil types which are classified as low, moderate, and high site productivity. Due to the high canopy closure and high tree density that must occur in stands to provide dispersal habitat, stand viability is greatly reduced in areas where site productivity is low to moderate. In areas where site productivity is moderate to high, stand viability may be maintained for a longer duration.

The retention strategy identified a range of retention levels for dispersal habitat across the project area. Within stands containing low site productivity, dispersal habitat/untreated stands will be retained at a 10% level, in the areas with moderate site productivity dispersal habitat/untreated stands will be retained at a15% level, and in areas that have the highest site productivity dispersal habitat/untreated stands will be retained at the 20% level. Retention will occur on a stand by stand basis to retain areas that contain the highest densities of contiguous dispersal habitat. Therefore no untreated areas will occur within implementation units. Approximately 1,317 acres of the project area have been identified as low site

productivity, therefore 10% or 131 acres will be retained in areas that provide dispersal habitat for the spotted owl. Approximately 1,451 acres of the project area have been identified as moderate site productivity, therefore 15% or 217 acres will be retained in areas that provide dispersal habitat for the spotted owl. Approximately 1,832 acres of the project area have been identified as high site productivity, therefore 20% or 366 acres will be retained in areas that provide dispersal habitat for the spotted owl. See Table 12 for a summary of retention objectives by site potential. These areas will provide residual overstory diversity and structure to allow for dispersal through the project area.

Table 12: Retention Strategy by Site Productivity for the Melvin Butte Project Area.

Retention Levels	**Acres of Melvin Butte Project Area in Low, Medium, and High Site Productivity**	**Total Acres Identified to Minimally Retain as Dispersal Habitat**
10 percent	1,317 acres	131 acres
15 percent	1,451 acres	217 acres
20 percent	1,832 acres	366 acres
Total	4,600 acres	714 acre

To meet the objectives identified in the above Table 12, stands were reviewed and those stands containing the highest densities of contiguous dispersal habitat were identified and retained as No Treatment areas. The following Table 13 displays the actual acres identified for dispersal stands based on site productivity.

Table 13: Retention Strategy by Site Productivity for the Melvin Butte Project Area.

Retention Levels	**Acres of Melvin Butte Project Area in Low, Medium, and High Site Productivity**	**Actual Acres Retained for Dispersal Habitat**
10 percent	1,317 acres	158 acres
15 percent	1,451 acres	230 acres
20 percent	1,832 acres	364 acres
Total	4,600 acres	752 acres

In addition, the connectivity strategy was built around other stands that will not be treated for other resource issues which also contain dispersal habitat. These areas include the Three Creeks riparian reserve and some areas of steep slopes that are excluded from treatment which total approximately 162 acres.

Of the 2,796 acres of dispersal habitat identified within project area, 914 acres or 32% of the area will be retained to provide connectivity for dispersing birds in a north south continuum throughout the project area.

Alternative 1 (No Action)—Ecological Trends

Under the No Action Alternative, no treatments will be prescribed within Melvin Butte project area (5,375 acres). However, the "ecological trend" in the short-term is that these stands would continue to remain suppressed and at risk of a stand-replacing wildfire. Development of future old growth within ponderosa pine and mixed conifer stands would be prolonged and the old trees within these stands would continue to be stressed, decreasing their longevity. However, stands would continue to provide dispersal habitat in the short-term. In the long-term, if a stand replacing wildfire or insect outbreak hasn't occurred, the stands containing disease would continue to die and the multi-storied structure would diminish along with any remnant old growth trees. As a result, dispersal habitat for the northern spotted owl will continue to diminish as the overstory canopy's become more open making the species more susceptible to

predation. Due to stand densities within the project area and increases in mortality overtime, the risk of large scale stand replacing fire across the Melvin Butte project area also increases over time, potentially impacting spotted owl dispersal habitat.

Stand resilience to insects, disease, and wildfire is measured by the Upper Management Zone (UMZ) . The UMZ relates to the density of trees (basal area, trees per acre, etc.) a forest stand can support without significant mortality from bark beetles. The upper management zone is the density level at which trees begin to come under significant stress and can become susceptible to bark beetles and other insects and diseases. Forest stands managed below the upper management zone are more resilient. There are approximately 4,456 acres that have the potential to receive vegetation treatment. Under the existing condition, 92% of these stands are above the Upper Management Zone and are at risk or may currently be impacted by insects and disease due to high stand densities and as a result low resiliency.

Direct and Indirect Impacts—Alternatives 2 and 3

The Revised Recovery Plan emphasizes the conservation of spotted owl sites and high value spotted owl habitat (page I-2). Interim Guidance recommends that site conservation priorities for reproductive status are (page III-44):

- Known sites with reproductive pairs;
- Known sites with pairs;
- Known sites with resident singles; and
- Historic sites with reproductive pairs, pairs, and resident singles, respectively.

Further recommendations include avoiding activities that would reduce nesting, roosting, and foraging habitat within provincial home ranges (1.2 mile radius) of reproductive pairs (III-45). The project meets the interim guidance and recommendations.

No known sites or historic sites occur within the project area, therefore disruptive work activities will not take place within ¼ mile (1.0 miles for blasting, ½ mile for helicopter) of any newly discovered nest sites or home ranges from March 1 to September 30.

The project area does not contain any suitable NRF habitat, therefore no thinning or prescribed burning will occur within suitable NRF habitat. Therefore, there will not be any modification of any NRF habitat in Critical Habitat ECN 8 subunit.

Treatment types for Alternatives 2 and 3 include thinning from below (HTH), mixed conifer thinning from below with group opening (MCGO), mixed conifer thinning from below without group openings (MC without openings), non-commercial thinning (P), Burn Only (B), lodgepole improvement (LPI), and dwarf mistletoe restoration (DM). The following Table 14 summarizes the acres associated with each treatment type.

Table 14: Treatment Type and Acres for Alternative 2 and 3.

Treatment Type	**Alternative 2**	**Alternative 3**
HTH	1,008 acres	1,169
MCGO	892 acres	0
MC without openings	0	820
P	1,179	1,179
B	772	772
LPF	445	445
DM	160	0
Total Acres.	**4,456**	**4,385**

Under both Alternatives 2 and 3, of the approximately 2,796 acres of available dispersal habitat, approximately 1,882 acres will be treated. The majority of the dispersal habitat occurs primarily within units associated with thinning from below (HTH), mixed conifer thinning from below (MCGO and MC without openings), and Prescribed Burning. Some of the second growth ponderosa pine non-commercial thinning units (P), where trees are approximately 40+ years ol, minimally meet the requirement for dispersal habitat and therefore dispersal is not typically contiguous in these units.

Very little to no dispersal habitat exists in the lodgepole improvement units or dwarf mistletoe units. The dwarf mistletoe units are associated with past ponderosa pine shelterwood harvest, containing a sparse overstory of individual large trees with a dense understory of regeneration approximately 20 to 40 years old. These stands are very open and over story canopy is discontinuous, therefore does not provide dispersal habitat.

Very little to no dispersal habitat exists within the lodgepole pine improvement units,. A mountain pine beetle outbreak impacted this area approximately 15 years ago and as a result, stands are very fragmented and discontinuous.

The objective each type of thinning is to reduce stand densities by thinning from below to 1) to increase stand resiliency to insects and disease, 2) reduce fuel loading as well as ladder fuels minimizing the risk of stand replacing fire and 3) promote the development of fire tolerant late and old structure stands.

Due to impacts to the majority of NRF and dispersal habitat from stand replacing fire across the district, thinning treatments were designed to maintain and promote overstory ponderosa pine. Ponderosa pine is the building block of large tree structure that provides the basis for NRF and dispersal habitat. These trees take the longest to develop and recruit into the overstory. Due to overstocked stands, fire intensity has been such, that these once fire resilient trees succumb to crown fire and many old growth ponderosa pine stands as well as residual old growth legacy trees have been lost to stand replacing fire. Thinning from below (HTH) has been designed to thin stands in a mosaic fashion retaining heterogeneity in dry mixed conifer and promoting heterogeneity in second growth ponderosa pine stands. Although HTH units will reduce stand densities to a level that canopy cover does not meet minimum requirements for dispersal habitat, treatments will maintain fully stocked stands and contiguous overstory crowns.

Mixed conifer thinning (both MCGO and MC without openings) will also thin stands from below. This treatment focuses on maintaining overstory ponderosa pine removing white-fir and lodgepole pine that contain insects and disease. Treatments also focus on removing ladder fuels in the understory of overstory ponderosa pine. To maintain a contiguous overstory stand, larger overstory white-fir not directly competing with overstory ponderosa pine will be retained. However , to build stand resiliency, within mixed conifer treatments associated with group openings, where stand contain no ponderosa pine, 1-3 acre group openings will be created and reforested with ponderosa pine. This will occur within 30% of this treatment type or on approximately 268 acres, reducing some overstory continuity.

Prescribed burning treatments (B) are designed for maintenance of late and old structure ponderosa pine stands. These stands will only receive prescribed burning and are not expected to reduce canopy cover but to use prescribed fire to reduce understory shrub densities as well as sapling size regeneration.

Treatments were designed to minimize the continued fragmentation of spotted owl dispersal habitat on the landscape in the long-term, and in the short-term to provide connectivity through the project area. The largest blocks of contiguous dispersal habitat were retained throughout the project area. Treatments were designed around these blocks of habitat to maintain movement through the project area.

The project *may affect but is not likely to adversely effect* dispersal habitat from thinning stands from below and reducing canopy cover to levels that no longer meet the dispersal definitions in the programmatic BA.

Physical and Biological Features/ Primary Constituent Elements of Critical Habitat

East Cascades Special Management Considerations/Protection

Special management considerations or protection may be required in the East Cascades to address the effects of past activities associated with Euro-American settlement, such as timber harvest, livestock grazing, fire suppression, and fire exclusion, that have substantially altered the inland northwest, modifying the patterns of vegetation and fuels and subsequent disturbance regimes to the degree that contemporary landscapes no longer function as they did historically. This has affected not only the existing forest and disturbance regimes, but the quality, amount, and distribution of spotted owl habitat on the landscape. In order to preserve the essential physical or biological features, dynamic, disturbance-prone forests should be managed in a way that promotes spotted owl conservation, responds to climate change, and restores dry forest ecological structure, composition, and processes including wildfire and other disturbances. The following restoration principles were considered during project design:

1. Conserve older stands that contain the conditions to support spotted owl occupancy or high value owl habitat
2. Emphasize vegetation management treatments outside spotted owl territories or highly suitable habitat
3. Design and implement restoration treatments at the landscape level
4. Retain and restore key structural components, including large and old trees, large snags, and downed logs
5. Retain and restore heterogeneity within stands
6. Retain and restore heterogeneity among stands
7. Manage roads to address fire risk
8. Consider vegetation management objectives when managing wildfires where appropriate

Approximately 3,731 acres of CHU Subunit ECN8 occur within the project area. Overall, the project is associated with approximately 4% of the total ECN 8 acres. Approximately, 2,343 acres of dispersal habitat occurs within the CHU area associated with the Melvin Butte project. Approximately 742 acres or 31% of dispersal/connectivity stands within the CHU associated with the Melvin project will be retained in untreated stands. No NRF habitat exists within the CHU.

Table 15: Summary of Effects to Dispersal Habitat in CHU ECN8 overlapping the Melvin Butte Project Area.

Acres of CHU occurring Melvin Butte Project Area	% of Melvin Butte Project Area associated with total CHU Subunit ECN8	Acres of Dispersal Habitat within CHU in Melvin Butte Project Area	Acres of Dispersal Habitat retained within CHU in Melvin Butte Project Area Post Treatment	Acres of Dispersal Habitat reduced within CHU in Melvin Butte Project Area	% Dispersal Habitat within CHU in Melvin Butte Project Area Post Treatment
3,731 acres	4%	2,343 acres	742 acres	1,601 acres	31%

Table 16: Summary of Effects to Dispersal Habitat within total Melvin Butte Project Area.

Overall acres of Dispersal Habitat within Melvin Butte Project	Overall acres of Dispersal Habitat retained within total Melvin Butte	Overall acres of Dispersal Habitat reduced within total	% Dispersal Habitat retained with the Melvin Butte Project

Area	Project Area Post Treatment	Melvin Butte Project Area	Area Post Treatment
2,796 acres	914 acres	1,882 acres	33%

Treatments within the Melvin Butte project area and the CHU associated with the project area were designed with the intent of meeting the East Cascade Special Management Considerations. All thinning from below (HTH), mixed conifer with and without group openings (MCGO, MCWOGO), and prescribed burning (B) treatments were designed with the objective of meeting all 8 management considerations. There are no stands within the project area that support owl occupancy and no owl territories occur within or adjacent to the project area. Thinning prescriptions are a thinning from below retaining late and old structure overstory stands and no snags or down logs are proposed for removal with this project. Mosaic thinning will occur within black bark ponderosa pine to promote heterogeneity and the development of late and old structure stands. Thinning from below in multi-story mixed conifer stands will retain stand heterogeneity by maintaining all the components of the residual age classes and a fully stock stand post thinning. Stands containing the largest contiguous blocks of dispersal habitat were retained between treatment units to retain heterogeneity between stands. Approximately 7.71 miles of roads are proposed to be decommissioned and close approximately 5.85 miles of roads under all action alternatives, reducing road densities in the project area from 5.86 mile/sq. mile to 4.40 miles/sq. mile.

The portion of ECN 8 associated with the Melvin Butte project is a very important element of the subunit. This portion of the subunit provides a very narrow band of connectivity between unsuitable habitat associated with the highly fragmented Pole Creek fire and private timber land directly adjacent and east of the project which is managed for timber production. Directly south of and outside of ECN 8, the plant community changes to lodgepole pine/mountain hemlock dominated stands.

There are limited large blocks of dispersal habitat in this area due to the impacts from past mountain pine beetle outbreaks. No existing NRF habitat or territories occurs directly adjacent to the Melvin Butte project area. Existing dispersal habitat only provides movement through the area in a north to south continuum and does not connect any highly suitable habitat. Connectivity throughout the ECN 8 subunit will not be disrupted by activities associated with the Melvin Butte project. Although treatments will degrade existing dispersal habitat, it will not create barriers to movement, but will reduce security that high canopy closures provide. However, the connectivity strategy provides large untreated blocks between stands thinned from below and will still allow movement while reducing the ongoing fragmentation from stand replacing fire that occurred in the adjacent Pole Creek fire as well as across the district over the past 15 years.

There are approximately 4,456 acres that have the potential to receive vegetation treatments. As a result of both action alternatives, 90% of these stands will be below the Upper Management Zone. Treatment will greatly increase stand resiliency to insects, disease, and wildfire through stand density reductions.

Alternatives 2 and 3 *may affect but arn not likely to adversely effect* designated Critical Habitat.

Cumulative Effects—Alternatives 2 and 3

The cumulative effects area for both action alternatives is both the Whychus and Deep Canyon watersheds as they overlap ECN 8. Both watersheds were utilized to best display the historic spotted owl occupancy on the landscape. The western half of both watersheds occurs within the range of the northern spotted owl under the Northwest Forest Plan boundary. Approximately 122 acres of NRF habitat occurs in the eastern area of the Deep Canyon watershed. No known spotted owl homes ranges or home ranges or detections occur in the Deep Canyon watershed. None of the proposed actions in the watersheds are anticipated to have an effect on spotted owl NRF habitat.

No home ranges occur in the Deep Canyon watershed. Table 17 lists the habitat conditions for each historic home range that occurs in the adjacent Whychus watershed. The Black Crater and Bluegrass Butte home ranges are considered viable but not active.

Table 17: Spotted owl home ranges

Spotted Owl Home Range	Viability and Status	NRF Acres within 1.2 Mile Home Range	Existing Percent (%) NRF acres within 1.2 Mile Home Range	NRF Acres in ECN 8 within 1.2 Mile Home Range	Last year of Activity
Deep Canyon Watershed					
No home ranges occur in this watershed					
Whychus Watershed					
Snow Creek	Non-viable	37	1%	0	2010
Trout Creek	Potentially viable but inactive	553	19%	2,611	1993
Black Crater	Potentially viable but inactive	807	28%	1,197	2007
Bluegrass Butte	Potentially viable but inactive	249	9%	2,510	2007

Fires have had the greatest influence on spotted owl habitat across the Sisters Ranger District due to the reduction of canopy cover, loss of multi-storied stands, and mortality of understory white-fir and to a lesser degree the loss of large Douglas-fir and ponderosa pine prior to the fires. These open stands are considered unsuitable nesting habitat for spotted owls. Insect and disease outbreak in the Whychus and Deep Canyon watersheds along with the Pole Creek Fire have produced ample down wood to meet forest standards and guidelines for down wood in the LSR and Matrix. The watershed has experienced moderate to heavy mortality with the insect outbreak of the early 1990s.

The influx of snags that fall will increase the amount of down wood in the next 20 years. In the mixed severity areas, trees that survived the Pole Creek Fire will be able to provide a more consistent supply of dead wood material. Within stand replacement areas much of the pre-existing downed wood was consumed. However, within the fire perimeter a percentage of the existing down woody material are trees that have fallen since the fire and most are in Decay Classes 1 and 2 (Thomas 1979, Brown 1985). Some downed material was consumed within the mixed mortality and underburned areas as well, especially where fire intensity was greater. This primarily consisted of smaller material (<12 inches dbh) and advanced decayed logs. Larger pre-existing material is still present although logs are now case-hardened in many situations.

The last 100 years of fire suppression has changed stand composition across the Sisters Ranger District. Stand densities have increased as well as outbreaks of insects and disease, although both are endemic to the district. As a result of disturbance large tracks of mortality exist in stands across the district. Since 2002, no major fires have occurred within the Deep Canyon watershed until the 2012 Pole Creek fire where approximately 4,081 acres burned and Two Bulls fire that burned approximately 487 acres totaling approximately 4,568 acres

Table 18: Recent Fire History in the Deep Canyon and Whychus Watersheds since 2002.

Fire	Year	Acres of National Forest Land
Deep Canyon Watershed		
Pole Creek	2012	4,568
Two Bulls	2014	487
Whychus Watershed		
Cache	2002	40
Black Crater	2006	5,147
Lake George	2006	1,857
GW	2007	186
Black Butte 2	2009	559
Rooster Rock	2010	1,362
Pole Creek	2012	22,512
	Whychus Total	**31663**

The Pole Creek Fire Danger Tree Removal project, Pole Creek Fire Timber Salvage project, and Two Bulls Timber Salvage projects total approximately 1,584 acres. These are ongoing and future projects that will and have removed fire killed trees reducing snag densities within the watersheds reducing snag habitat in the watersheds. These projects do not propose to remove spotted owl NRF or Dispersal habitat. The Pole Creek Fire Danger Tree Removal project and Pole Creek Fire Timber Salvage project both occur within ECN 8.

Activities proposed under the Sisters Area Fuels Reduction (SAFR) project, Glaze Forest Restoration project, Ursus Hazardous Fuels Reduction project, Bend Municipal Watershed Fuels Reduction project, Bear Wallow Fire Wood project have occurred or will occur in the two watersheds. Fuels reduction treatments focus on removing dead lodgepole pine among green stands to reduce fuel loading. The SAFR and Glaze projects only occur within the Whychus watershed and both focus on thinning from below to restore and enhance ponderosa pine conifer stands while reducing the risk of stand replacing fires. These projects do not occur within NWFP lands (outside of the range of the northern spotted owl), therefore do not contribute to cumulative effects. The Ursus Hazardous Fuels Reduction project, Bend Municipal Watershed Fuels Reduction project, Bear Wallow Fire Wood projects are all within mixed conifer or lodgepole pine habitat types. These projects all occur within the Deep Canyon watershed. However, these projects do not occur with ECN 8. Only one project occurs within spotted owl Critical Habitat, the Bend Municipal Watershed project, and it occurs in ECN 9. These areas are associated with high levels of bark beetle mortality to lodgepole pine stands. These project areas will directly remove snags to break of fuel continuity within these areas and therefore will reduce snag and log habitat. In addition these projects will also thin stand from below reducing stand densities. No suitable spotted owl NRF habitat will be removed as result of these projects. Overall, the projects that occur within NWFP lands will reduce fuel densities on approximately 7,060 acres. These projects are being implemented to reduce the risk of loss of existing habitat from future large-scale disturbances.

Personal use firewood cutting is occurring within the 3,029 acre Three Creek's Firewood Cutting area. Individual dead trees are being removed by personal use firewood cutters primarily within the road prism of open roads. Cutting is not wide spread and occurs on a site specific basis, where individual trees are removed or small groups of dead trees. Only dead lodgepole pine and white-fir can be taken for firewood.

The proposed thin from below, mow, and burn treatments in the vegetation management projects associated with the Whychus and Deep Canyon Watersheds would accelerate the development of large tree structure in mixed conifer which would provide positive benefits for owl habitat in the long-term

(i.e., greater than 30 years post-implementation). This treatment would select and retain the healthiest and largest trees that would be the most resilient to the effects of fire. Within lodgepole pine stands, the focus would be to remove concentration of dead trees, and promote the natural regeneration of lodgepole pine. Lodgepole pine treatments will not remove spotted owl habitat, but will promote the development of fully stocked overstory lodgepole pine stands. The intent of the treatment is to capture the utility of green lodgpole pine stands for spotted owl dispersal during the 100 year rotation, and before the next infestation of the mountain pine beetle. However mixed conifer thinning from below will also occur and will directly reduce dispersal habitat across the approximately7,060 acres associated with these projects.

Conclusion—Alternatives 2 and 3

Alternative 2 and 3 in the Melvin Butte project area does not impact any NRF habitat. Alternatives 2 or 3 will reduce approximately 1,882 acres of dispersal habitat, retaining 914 acres of the largest concentrated blocks of dispersal habitat, therefore ***May Affect but is Not Likely to Adversely Effect*** spotted owl connectivity. The project ***May Affect but is Not Likely to Adversely Effect*** primary constituent elements in 2013 designated critical habitat by reducing approximately1,601 acres of dispersal habitat, retaining approximately 742 acres of the largest concentrated block of dispersal habitat. The project is consistent with the 2011 Revised Recovery Plan. The project is consistent with the Deschutes National Forest Plan standards and guidelines as amended by the Northwest Forest Plan.

Mitigation Measures: Disruptive work activities will not take place within ¼ mile (1.0 miles for blasting, ½ mile for helicopter) of any newly discovered nest sites or home ranges from March 1 and September 30. This condition may be waived in a particular year if nesting or reproductive success surveys reveal that spotted owls are non-nesting or that no young are present that year. Waivers are valid only until March 1 of the following year.

Oregon Spotted Frog, Threatened

Measure: Effects to breeding, reproduction, and rearing habitat

Existing Condition

The Oregon spotted frog inhabits the margins of lakes, marshes, and pools in streams where there is an abundant growth of vegetation (Csuti et al. 2001). Literature cited in the Conservation Assessment (Cushman and Pearl, 2007) describes spotted frog breeding habitat as moderate to large wetlands with extensive emergent marsh coverage that warms substantially during seasons when Oregon spotted frogs are active on the surface (February to May). Sites always include some permanent water juxtaposed to seasonally inundated habitat.

No habitat exists for the Oregon spotted frog and within the Melvin Butte project area. No Oregon spotted frog Critical Habitat Exists within the Melvin Butte project area. No further analysis is required.

Sensitive Species

Table 19 lists 22 Regional Forester sensitive species known to occur or potentially occur on the Deschutes National Forest. Based on a review of records and habitat requirements, the following sensitive species have potential habitat in the project area and may be impacted by the proposed action: Townsend's big-eared bat, fringed myotis, pallid bat, white-headed woodpecker, and Lewis' woodpecker.

Table 19: Regional Forester Sensitive Species occurring or potentially occurring on the Deschutes National Forest.

Regional Forester Sensitive Species				
INVERTEBRATES				
Species	Status	Habitat	Habitat /Presence in Project Area	Effect
Western bumblebee (*Bombus occidentalis*)	Sensitive	Forest edges, gardens, near houses and urban areas	No habitat	No impact
Johnson's hairstreak (*Callophrys johnsoni*)	**Sensitive**	**Mixed forests with dwarf mistletoe**	**Existing habitat**	**May Impact**
Silver-bordered fritillary (*Boloria selene*)	Sensitive	Bogs and wet meadows	No habitat	No impact
Crater Lake tightcoil (*Pristiloma articum crateris*)	Sensitive	Perennial riparian areas	No habitat	No impact
Evening field slug (*Deroceras hesperium*)	Sensitive	Perennial wet meadows	No habitat	No impact
AMPHIBIANS				
Columbia spotted frog (*Rana luteiventris*)	Federal Proposed, Sensitive	Shallow lakes, ponds	No habitat	No impact
MAMMALS				
Townsend's big-eared bat (*Corynorhinus townsendii*)	**Sensitive, MIS**	**Caves, mines, bridges, buildings, rock outcrops, snags in conifer forests, desert**	**Existing habitat**	**May Impact**
Fringed myotis (*Myotis thysanodes*)	**Sensitive**	**Caves, mines, bridges, buildings, rock outcrops, snags in conifer forests, desert**	**Existing habitat**	**May Impact**
Pallid bat (*Antrozous pallidus*)	**Sensitive**	**Caves, mines, bridges, buildings, rock outcrops, snags in conifer forests, desert**	**Existing habitat**	**May Impact**
Spotted bat (*Euderma maculatum*)	Sensitive	Cliffs, caves, rock outcrops in sagebrush/desert habitat	No habitat	No Impact
North American wolverine (*Gulo gulo luscus*)	Sensitive, MIS	Mixed forests, High elevation	No denning habitat; low potential for dispersal	No Effect

			habitat	
BIRDS				
Lewis' woodpecker (*Melanerpes lewis*)	**Sensitive, MIS**	**Open ponderosa pine snags, burned areas**	**Existing habitat**	**No impact**
White-headed woodpecker (*Picoides albolarvatus*)	**Sensitive, MIS**	**Large-diameter ponderosa pine snags**	**Existing habitat**	**No impact**
American Peregrine Falcon (*Falco peregrinus anatum*)	Sensitive, MIS	Riparian, Cliffs	No habitat	No impact
Bald eagle (*Haliaeetus leucocephalus*)	Sensitive, MIS	Lakes, snags	No habitat	No impact
Greater sage grouse (*Centrocercus urophasianus)*	Federal Candidate, Sensitive	Sagebrush flats	No habitat	No Impact
Bufflehead (*Bucephala albeola*)	Sensitive	Lakes, snags	No habitat	No Impact
Northern waterthrush (*Seiurus noveboracensis)*	Sensitive	Riparian streambanks with dense willows	No habitat	No Impact
Harlequin duck (*Histrionicus histrionicus*)	Sensitive	Rapid streams, Large trees	No habitat	No Impact
Horned grebe (*Podiceps auritus*)	Sensitive	Lake	No habitat	No Impact
Tricolored blackbird (*Agelaius tricolor*)	Sensitive	Lakeside, bulrush (cattails)	No habitat	No Impact
Yellow Rail (*Coturnicops noveboracensis*)	Sensitive	Marsh	No habitat	No Impact
Tule greater white-fronted goose (*Anser albifrons*)	Sensitive	Nests on marshy ponds in the tundra; winters in open country	No habitat	No Impact

Rationale for Regional Forester Sensitive Species Not Analyzed in Detail

Silver-bordered fritillary

This butterfly ranges from Central Washington south along the Rocky Mountains to northern New Mexico and east to Illinois, Virginia and Maryland. They inhabit wet meadows, bogs, and marshes as well as forest openings in mountainous areas, and spring-fed meadows in dry prairies (NatureServe 2012). Two primary colonies exist in Oregon: one at Big Summit Prairie on the Ochoco National Forest and one in the Strawberry Mountains in the Malheur National Forest (Miller and Hammond 2007). Threats to this species include livestock overgrazing, wetland loss, and woody vegetation encroachment of willows and hawthorns from fire suppression (Miller and Hammond 2007). Adults lay eggs singly near host plants of

the violet family including *Viola glabella* and *V. nephrophylla*. Caterpillars that develop from the eggs feed on these host plants and overwinter by hibernating, emerging as adults in the spring. Favored nectar sources for adults are composite flowers including goldenrod and black-eyed susans. Adults fly May to July with a second generation flying from August into September. There are no proposed treatment activities in riparian habitat. Implementation of Alternatives 2 or 3 would have ***No impact*** on the silver-bordered fritillary.

Crater Lake tightcoil

This snail can be found in suitable wet habitat on the undersides of woody debris, among wet mosses, rushes, and other low vegetation at the edges of wetlands, springs, seeps, and streams in perennially damp forest floor litter, especially where it has accumulated at the bases of shrubs and against logs (Duncan et al. 2003). Suitable wet habitat would be considered as almost exclusively very stable, perennially wet riparian edges around wetlands, springs, seeps, streams, and damp forest floor. Areas that are temporarily wet habitat such as stream borders that may change location (up and down the stream bank) or are seasonally underwater or dry, are not suitable habitat for this species. Only areas with constant water levels that create perennially saturated habitat year-round are suitable and may be occupied. There are no proposed treatment activities in riparian habitat. Implementation of Alternatives 2 or 3 would have N***o impact*** on the Crater Lake tightcoil.

Evening fieldslug

According to Duncan (2005), the evening fieldslug is associated with perennially wet meadows in forested habitats. Microsites include a variety of low vegetation, litter, and debris; rocks may also be used as refugia. This species appears to have high moisture requirements and is almost always found in or near herbaceous vegetation at the interface between soil and water, or under litter and other cover in wet situations where the soil and vegetation remain constantly saturated. Typical landscape features that may provide constant moisture conditions include springs and seeps, as well as wetlands in depressions and around perennial ponds. There are no proposed treatment activities in wet meadows, springs, or seeps. Implementation of Alternatives 2 or 3 would have ***No impact*** on the evening fieldslug.

Columbia spotted frog

Columbia spotted frogs inhabit the margins of lakes, marshes, and pools in streams where there is an abundant growth of vegetation (Csuti et al. 2001). There are no proposed treatment activities in standing water, streams (intermittent or perennial) or riparian areas. This species is not known to occur on the Sisters Ranger District. Implementation of Alternatives 2 or 3 would have ***No impact*** on the Columbia spotted frog.

Spotted bat

The spotted bat is mostly found in desert and canyon habitats. They roost in caves, mines, rock outcrops, and especially crevices in tall vertical cliffs. Roosts are usually near a source of water, but this does not appear to be a main requirement for roosting locations. Winter hibernation sites are poorly known. NatureServe (2012) considers the spotted bat to be widespread in western North America with sparse populations but it may be more common than formerly believed. Abundance, population trends, and threats are largely unknown. This species has not been documented on the Deschutes National Forest but has been detected adjacent to the Deschutes National Forest at Lake Billy Chinook east of the Sisters Ranger District and in Dry River Canyon near Highway 20 north of the Bend-Ft. Rock Ranger District. Potential habitat exists on the eastern fringe of the Deschutes National Forest but not in the project area. Implementation of Alternatives 2 or 3 would have ***No impact*** on the Pallid bat.

American peregrine falcon

In Oregon, the peregrine falcon nests on cliffs ranging in height from a 75-foot escarpment at a reclaimed quarry to monolithic 1,500-foot high cliffs, as well as structural features of bridges (Joel E. Pagel *in* Marshall et al. 2006). There are no high escarpments, cliffs, or tall bridges in the project area. Implementation of Alternatives 2 or 3 would have ***No impact*** on the peregrine falcon.

Bald eagle

Suitable habitat for the bald eagle is characterized by the presence of large (mature) trees generally >32 inches dbh. Ponderosa pine and Douglas fir trees with large open limb structures are preferred for nesting on the Deschutes National Forest. Other habitat attributes are the availability of prey, usually within one mile of their nesting territory, and a large water body. Reproductive or foraging habitat for the bald eagle does not occur in the project area. The closest known nest site is six miles from the project area. Implementation of Alternatives 2 or 3 would have ***No impact*** on the bald eagle.

Greater sage grouse

The greater sage grouse is found in foothills, plains, and mountain slopes where sagebrush is present and the habitat contains a mixture of sagebrush, meadows, and aspen in close proximity. Winter habitat (palatable sagebrush) is probably the most limited seasonal habitat in some areas (NatureServe 2012). Sagebrush habitat in or adjacent to the project area does not exist. Implementation of Alternatives 2 or 3 would have ***No impact*** on greater sage grouse.

Bufflehead

The bufflehead typically nests at high-elevation forested lakes in Central Oregon, using cavities or artificial nest boxes in trees close to water, with most nests within 75 feet of water, but sometimes as far as 650 feet away (Marshall et al. 2003). The birds nest in natural cavities or abandoned northern flicker holes in mixed coniferous-deciduous woodlands near lakes and ponds. There are no lakes or ponds in the project area. Implementation of Alternatives 2 or 3 would have ***No impact*** on the bufflehead.

Northern waterthrush

The northern waterthrush inhabits riparian habitat, often with willow and alder (NatureServe 2012). There are no proposed treatment activities in stream or riparian habitat. Implementation of Alternatives 2 or 3 would have ***No impact*** on the northern waterthrush.

Harlequin duck

The harlequin duck nests along fast-moving rivers and mountain streams on rocky islands or banks. It requires relatively undisturbed, low gradient, meandering mountain streams with dense shrubby riparian areas (greater than 50% streamside shrub cover), and woody debris for nesting and brood rearing; also needs mid-stream boulders or log jams and overhanging vegetation for cover and loafing; indicator of high water quality (Spahr et al. 1991). There are no proposed treatment activities in stream habitat or riparian in the project area. Implementation of Alternatives 2 or 3 would have ***No impact*** on the harlequin duck.

Horned grebe

The horned grebe is a rare breeder east of the Cascades and favor semi-permanent ponds (Marshall et al. 2003). They nest among tall vegetation in shallow water on small and large lakes and ponds (approximately ¼ acre or larger), in calm waters of marshes, along rivers and streams. The highest breeding densities occur in pothole marshes of aspen woodlands. Outside the breeding season, horned grebes are found on bays, estuaries and seacoasts, and in migration commonly in inland freshwater habitats, especially lakes and rivers (NatureServe 2012). There are no proposed treatment activities in stream or riparian habitat in the project area. Implementation of Alternatives 2 or 3 would have ***No impact*** on the horned grebe.

Tricolored blackbird

In Oregon, this species is restricted to breeding in southern Oregon and prefers to breed in freshwater marshes with emergent vegetation (cattails) or in thickets of willows or other shrubs (Csuti et al. 2001). In migration and winter they are found in open cultivated lands and pastures (NatureServe 2012). There are no marshes with emergent vegetation in the project area. There are no proposed treatment activities in marshes with cattails and tules. Implementation of Alternatives 2 or 3 would have ***No impact*** to the tri-colored blackbird.

Yellow rail

The nesting habitat of the yellow rail in southcentral Oregon was described as marshes or wet meadows with an abundance of thin-leaved sedges, a layer of senescent (old) vegetation to conceal their nests, and water depths of 0.5 to 5 cm (Popper and Stern 2000). There are no proposed activities in wet meadows or riparian areas. Implementation of Alternatives 2 or 3 would have ***No impact*** to the yellow rail.

Tulewhite-fronted goose

Tule greater white-fronted geese use Oregon as a stop-over location during migration. They prefer marshes and feed more in lower elevation wetland habitat and less in agriculture fields (NatureServe 2012). There are no proposed treatment activities in marshes or tules. Implementation of Alternatives 2 or 3 would have ***No impact*** to the tule greater white-fronted goose.

Fringed myotis, Townsend's big-eared bat, and Pallid bat

Measure: Roosting and foraging habitat impacted

Existing Condition

The Northwest Forest Plan calls for retaining snags, decadent trees, and green tree recruitment for roosting bats in Matrix and Adaptive Management Areas (Page B-7, Stand Management):

"Adequate numbers of large snags and green trees are especially critical for bats because these trees are used for maternity roosts, temporary night roosts, day roosts, and hibernacula. These should be well distributed throughout the matrix because bats compete with primary excavators and other species that use cavities. Day and night roosts are often located at different sites, and migrating bats may roost under bark in small groups. Thermal stability within a roost site is important for bats, and large snags and green trees provide that stability. Individual bat colonies may use several roosts during a season as temperature

and weather conditions change. Large, down logs with loose bark may also be used by some bats for roosting."

Snag densities are poorly known for most species of bats but some research indicates that snag density requirements may be higher than those needed for woodpeckers (Lacki et al. 2008). Bats frequently switch roosts to escape predation and avoid parasites (Lewis 1995, Barclay and Kurta 2007).

Three sensitive bat species have potential habitat in the project area.

Townsend's big-eared bat

The Townsend's big-eared bat is a Regional Forester Sensitive Species and a Forest Plan Management Indicator Species. The following information is summarized from the 2012 forestwide habitat assessment for the Townsend's big-eared bat (USDA Forest Service 2012a). This species is dependent on cave or cave-like structures (buildings) year-round in mixed conifer forests, deserts, and agricultural areas. Foraging associations include edge habitats along streams and in forested habitats, particularly in sagebrush steppe and open ponderosa pine stands. There are no known caves in the project area. They are known to occur in a cave during fall and winter several miles north of the project area. They are assumed to seasonally migrate from the cave north of the project area to caves or cave-like structures in lower elevations during spring and summer. They were documented roosting in forested lava flows on the Deschutes National Forest during spring migration (Dobkins 1995). Lepidoptera, their primary insect prey, appears to be vulnerable to high-severity fire effects; however, low severity fires may enhance their habitat. This species is declining across the western U.S. It is considered stable or slightly decreasing on the Deschutes National Forest (USDA Forest Service 2012a).

The project are does not contain caves or cave like structures/rock outcrops that provide roosting habitat that would promote dispersal.

Fringed Myotis

The following information is summarized from the Western Bat Working Group Species Account for the Fringed myotis (Western Bat Working Group 2005a).

The fringed myotis is a small bat distributed patchily throughout the west. It occurs at 3,900 to 6,900 feet and is most common in drier woodlands (oak, pinyon-juniper, ponderosa pine) but can also be found in desert scrub, mesic coniferous forest, grassland, and sage-grass steppe. It roosts in large decadent trees and snags, crevices in buildings, underground mines and caves, rocks, cliff faces, and bridges. It is likely that structural characteristics (e.g. height, decay stage) rather than tree species play a greater role in selection of a snag or tree as a roost. The two most commonly reported orders in its diet are beetles and moths. This species is adapted for foraging within the forest interior and along forest edges.

Threats include loss or modification of roosting snag habitat, closure or renewed activity at abandoned mines, recreational caving and mine exploration, replacement of buildings and bridges with non- bat friendly structures, loss of clean, open water, and loss of prey species due to pesticides/chemicals.

No winter records in caves on the Deschutes National Forest have been documented. One record during summer surveys with the use of mist-nets was documented at the south end of the Bend-Ft. Rock Ranger District in 1992. Summer surveys have not occurred on the Sisters Ranger District. This species potentially occurs in snags in the project area.

Pallid Bat

Pallid bats day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees (*e.g.*, basal hollows of coast redwoods and giant sequoias, bole cavities of oaks, exfoliating ponderosa pine and

valley oak bark, deciduous trees in riparian areas, and fruit trees in orchards), and various human structures such as bridges, barns, porches, bat boxes, and human-occupied, as well as, vacant buildings (Western Bat Working Group 2005b). Roosts generally have unobstructed entrances/exits, and are high above the ground, warm, and inaccessible to terrestrial predators (Western Bat Working Group 2005b). Although year-to-year and night-to-night roost reuse is common, they may switch day roosts on a daily (1 to 13 days) and seasonal basis (Western Bat Working Group 2005b).

Recent research in northern California in the Plumas National Forest showed that pallid bats used cavities in large diameter trees and snags (>21 inches dbh) in mixed coniferous forests at elevations greater than 3,800 feet (Baker et al. 2008). The diet of pallid bats is varied including such insect taxa as beetles, centipedes, crickets, moths, scorpions, and termites. The pallid bat has only been documented once on the Deschutes National Forest on the Sisters Ranger District. The documentation was within low elevation late and old Structure ponderosa pine habitat. The majority of documented species have occurred on adjacent Bureau of Land Management lands in the southeastern corner of the Bend-Ft. Rock Ranger District.

Snag Habitat and Snags Associated with Post Fire Habitats

Bats use of trees and snags includes cavities in hollow trees, cracks or crevices in trees or snags, or behind exfoliating (sloughing) bark. They may be less likely to use heavily charred/sooty fire-killed trees if a sufficient number of roost trees are available in the surrounding area. The 2012 Pole Creek fire that is within and adjacent to the Melvin Butte project likely removed some roost habitat while creating additional roost habitat.

A small portion of the project area (approximately 240 acres) is associated with the Pole Creek Fire along the west side of the 16 road. Burn severity is variable along ranging from light underburn to stand replacing fire. Little is known about the roosting ecology of bats and their prey in burned forests. Limited research has focused on short-term bat foraging activity in burned areas with varying types of severity (Hayes 2009, Buchalski et al. 2013). In general, low intensity wildfires and prescribed fire create relatively few snags (Horton and Mannan 1988) and many are small diameter, which are of less use for most roosting bat species which usually prefer large-diameter (>21 inches dbh) roost trees (Barclay and Kurta 2006). For species that avoid foraging in dense forests, bat activity may increase in post-fire areas due to an increased insect productivity and more open foraging conditions at least for the first year after the fire (Buchalski et al. 2013). During this one year post-fire study, Buchalski et al. (2013) show that bat activity was either neutral or positive regardless of the intensity of the fire.

Lacki et al. (2012) monitored 301 roost snags of long-legged myotis in Oregon, Washington, and Idaho. This is one of the most common bat species occurring on the Deschutes National Forest. Overall, persistence rates declined with increasing roost-years across study areas. Roost snags in Washington showed a lower persistence rate 1 year post-discovery than did roost snags in Oregon and Idaho. Estimates of the percentage of snags still standing 10 years post-discovery were highest for ponderosa pine (6.8%), slightly less for Douglas-fir (5.3%), and lowest for grand fir (0.9%). They found half-lives of roost snags to be <3 roost-years, much shorter than other published values for half-lives of snags of multiple species of conifers (Russell et al. 2006, Angers et al. 2010), and the overall average of roost snag persistence 10 years post-discovery across snag species was 4.3%. Replenishment of snags suitable for long-legged myotis on an annual basis is likely needed to ensure adequate habitat of this bat species, especially given the frequency of roost switching within years shown by many bats (Lewis 1995, Barclay and Kurta 2007) and the short-term reuse of tree roosts among years.

Thinning from below and the retention of large trees and snags will reduce dense forest patches but improve foraging conditions for bats at least in the short-term, particularly where viable roosting habitats occur within close proximity to water.

As a result of the habitat summary the project area provides suitable naturally occurring and post fire snag habitat within the project areas for Pallid Bat and Fringed Myotis.

Alternative 1 – No Action (Ecological Trend)

Development of future old growth within second growth ponderosa pine and mixed conifer stands would be prolonged and the existing old trees within stands would continue to be stressed, decreasing their longevity. However, stands would continue to provide habitat in the short-term. In the long-term, if a stand replacing wildfire or insect outbreak hasn't occurred, the stands containing disease would continue to die and the multi-storied structure would diminish along with any remnant old growth trees. As a result, snags would be recruited for roosting, but overstory canopy would diminish changing stand structure that bats depend on for foraging. Due to stand densities within the project area and increases in mortality overtime, the risk of large scale stand replacing fire across the Melvin Butte project area also increases over time, potentially impacting bat habitat.

Stand resilience to insects, disease is measured by the Upper Management Zone (UMZ). The UMZ relates to the density of trees (basal area, trees per acre, etc.) a forest stand can support without significant mortality from bark beetles. The upper management zone is the density level at which trees begin to come under significant stress and can become susceptible to bark beetles and other insects and diseases. Forest stands managed below the upper management zone are more resilient. In addition, the UMZ correlation to high tree densities can also provide an indicator to areas that are susceptible to stand replacing wildfire. There are approximately 4,456 acres that have the potential to receive vegetation treatment. Under the existing condition/No Action Alternative 92% of these stands are above the Upper Management Zone and are at risk or could currently be impacted by insects and disease due to high stand densities. Under the No Action Alternative, no treatments will be prescribed within Melvin Butte project area (5,375 acres). However, the "ecological trend" in the short-term is that these stands would continue to remain suppressed and at risk of a stand-replacing wildfire.

Overall, high stand densities will result in a decrease in tree vigor among all size classes. The most significant effect of high stand densities will be lack of canopy closure and the loss of the existing historic large-tree component which is likely to occur at a much higher rate than if stand densities were reduced to more healthy levels. Suitable forested habitat for these species consist of late and old structure forests with low densities of large snag. This forest type provides ample shade from canopy closure under which bats can forage on insects, additionally also providing large snags with sloughing bark that provide high quality day roosting habitat. In the short-term higher densities of snags will exist with little canopy closure rather than slowly recruiting larger snags overtime that provide better roosting habitat for both the Pallid and Fringed Myotis bat species. In the long-term the area will lack large tree structure and suitable day roost sites for these species.

Alternative 2 and 3 - Direct and Indirect Effects

Thinning From Below (HTH), Mixed Conifer Thinning with Group Openings (MCGO), Mixed Conifer Thinning without Group Openings (MC-without openings), Non-commercial Thinning (P), Prescribed Burning (B) and Scenic Views Enhancement.

Commercial thinning (HTH) and Mixed Conifer Thinning with and without group openings (MCGO and MC - without openings) will consist of primarily thinning from below removing trees >8"dbh. Treatments will focus on maintaining the overstory trees in pure ponderosa pine and mixed conifer stands providing overstory large tree structure. Treatments will retain and promote the development of overstory ponderosa pine reducing site competition. Within mixed conifer treatments these stands are dominated by

small trees and will focus on reducing stand densities primarily removing second growth lodgepole pine and white-fir, favoring healthy white-fir and ponderosa pine. This treatment will result in the accelerated growth of residual trees while reducing the fire hazard. Long-term beneficial impacts of small tree thinning will be the reduction of habitat fragmentation by promoting the development of LOS habitat which include large snags at an accelerated rate. Short-term beneficial impacts will be seen in the reduction of risk to existing suitable habitat. This treatment will beneficial to the Pallid and Fringed Myotis bats by creating large snags over the long-term to be utilized as day roost habitat. Lastly, prescribed burning will be a follow up treatment for these treatments. Some large tree mortality is likely to occur from prescribed burning, creating some roosting habitat in the short-term. However, it is likely that there will be an incidental loss of large snags as result of prescribed burning reducing some existing roosting habitat on a site specific basis.

Non-commercial thinning (P) will occur within ponderosa pine plantations that are approximately 20 to 40 years old. Treatments will consist of removing material primarily <8"dbh and occasionally up to 12" dbh material in advanced regeneration plantations. These plantations does not currently provide high quality habitat for the Pallid and Fringed Myotis bats. In the long-term, thinning will reduce stand densities promoting the development of LOS ponderosa pine, recruiting large snag and creating more highly suitable day roost and foraging habitat in these areas.

Scenic Views Enhancement was developed to meet the scenic views Forest Plan standards and guides for the 16 road corridor. Treatments will remove small dense patches of fire killed trees to enhance the visual quality of the foreground. Small diameter fire killed trees are the focus, retaining all live trees and large snags to benefit scenic quality and maintain existing habitat. Treatments will not reduce roosting or foraging.

The objective of prescribed fire is to reduce fuel loading by using prescribed fire to create a continuous mosaic of burned and unburned habitat. Treatments may unintentionally burn existing snags, however new snags could also be recruited through this process. Mortality of snags in ponderosa pine habitat during prescribed fire treatments in Arizona and California ranged from 20% (Randall-Parker and Miller 2002), 45% (Horton and Mannan 1988), and 56% (Bagne et al. 2008). All three studies found that larger diameter ponderosa pine trees were least likely to die, at least in the short-term. Horton and Mannan (1988) found a 20-fold increase in abundance of snags < 15 cm dbh. Several studies showed that the highest snag losses were in areas where a long period of fire exclusion had occurred (Bagne et al. 1988, Holden et al. 2006). Bagne et al. (2008) and Horton and Mannan (1988) found that re-entry burns had a much lower mortality rate for snags, presumably because the trees that did not burn during the first entry were more resilient. Loss of snags from prescribed fire was partially mitigated by the creation of new snags (Horton and Mannan 1988, Bagne et al. 2008).

Table 20 summarizes the amount of habitat associated with treatments under each action alternative for the Melvin Butte project.

Table 20: Total acres of habitat associated with each treatment type by alternative.

Treatment Type	Alternative 2	Alternative 3
B	253	253
HTH	310	336
MC – No Group Opening	-	36
LPI	27	27
MCGO	36	-
P	493	493
Scenic Views Enhancement	41	41
Total Acres.	**1,160**	**1,186**

Overall, approximately 1,160 acres of habitat are associated with treatments identified under Alternative 2, and approximately 1,186 acres under Alternative 3. Alternative 2 is the most proactive, on the landscape this alternative does the best job at breaking up fuel continuity while maintaining large tree habitat.

Overall, implementation of the action alternatives will maintain existing habitat conditions for the Palid and Fringed Myotis bats by maintaining and enhancing the development of large trees structure across the project area. Treatments reduce the risk of losing existing roosting and foraging habitat to stand replacing fire. Under Alternative 2, through thinning, small opening will be created by removing white-fir that are succumbing to insects and disease. Trees removed on average are approximately 14 inches dbh and will not likely provide roosting habitat. However, this treatment will create small openings among fully stocked forest canopies and could enhance foraging opportunities. Treatments will not preclude use of the project area by these species and will increase as contiguous stand of LOS habitat develops across the project area. These changes will result in more sustainable habitat conditions across the landscape and move habitat conditions closer to historical conditions. Fire suppression has created denser conditions than historically occurred which have resulted in a decline in large tree open structure stands on the landscape.

The project area and habitat varies greatly from north to south due to the increase in elevation, the rain gradient associated with the change in elevation, and the site potential associated with the inherent soil quality within this north to south pattern. To capture the importance of habitat variation across the project area, the project area was broken up into 3 areas containing high, medium and low site potential based on inherent soil quality. The retention strategy identified a range of retentions levels across the project area. Within stands containing low site productivity, untreated stands will be retained at a 10% level, in the areas with moderate site productivity dispersal untreated stands will be retained at a15% level, and in areas that have the highest site productivity dispersal untreated stands will be retained at the 20% level. Retention will occur on a stand by stand basis to retain areas that contain the highest densities of contiguous habitat with a stand average of a minimum of 11 inches dbh and exceeding 40% canopy closure. These untreated areas were identified to retain habitat connectivity between thinned stands associated with project treatments.

Overall the project does not propose to remove any large snag habitat under both alternatives. However, through prescribed burning as a primary treatment to open old growth ponderosa pine stands and as a secondary treatment to thinning from below in multi-storied stands (B, HTH, MC, and MCGO), there is the potential of loss of large snags that provide roosting habitat on approximatley 599 acres under Alternative 2 and approximately 589 acres under Alternative 3.

There are no impacts to Townsend's big-eared bats due to lack of habitat within the Melvin Butte project area.

See snag analysis for complete summary of impacts to snag habitat.

Alternative 2 and Alternative 3 – Cumulative Effects

Activities identified in Table 1 (cumulative effect table for wildlife) were reviewed to assess whether, in combination with the likely impacts of the Melvin Butte project, there would be any cumulative impacts to the Pallid and Fringed Myotis bat roosting and foraging habitat. The Deep Canyon Watershed is being used as the scale for analysis for this species. Based on that review, the potential cumulative impacts are those discussed below.

Three large wildfires have occurred within or partially within the Deep Canyon watershed –Rooster Rock, Pole Creek, and Two Bulls Fire. Approximately 54 acres of the Pole Creek Salvage are ongoing and

approximately 250 acre is being salvage in association with the Two Bulls Fire. Danger tree removal occurred on all the fires mentioned above to varying degrees resulting in a reduction of potential nest sites in stand replacement areas along main roads.

Ursus Hazardous Fuels Reduction project, Bend Municipal Watershed Fuels Reduction project, and Bear Wallow Firewood projects have occurred or may occur in suitable habitat. These projects focus primarily on removing dead lodgepole pine among green stands to reduce fuel loading, some of the activity are also associated with mixed conifer habitat. Overall, treatments proposed will reduce the risk of loss of existing habitat from future large-scale disturbances. There are approximately 21,507 acres associated with these projects, within the Deep Canyon watershed.

Overall, implementation of the action alternatives as well as other projects within the watershed should result in improved habitat conditions for those species dependent on open canopy forest habitats which could lead, over time, to increased populations. Cumulatively there will be a decrease in dense understory habitat; these changes will result in more sustainable habitat conditions across the landscape and move habitat conditions closer to historical conditions.

Although treatments will thin stands that are currently suitable roosting and foraging habitat, the Melvin Butte project will have minimal impacts roosting and foraging within the Watershed or on the Deschutes National Forest for the Pallid and Fringed Myotis bats.

These (type) projects are not expected to result in cumulative effects in combination with the Melvin Butte project, because they will have no affect on Townsend's big-eared bathabitat. No short- or long-term Townsend's big-eared bat population decrease would occur; therefore, additive cumulative effects are not anticipated.

Conclusion

Cumulatively, with the ongoing forest management projects within the Deep Canyon watershed, the Melvin Butte project does not propose to remove large snags within the mixed conifer and ponderosa pine habitat types except any posing hazard to operations under OSHA guidelines and those incidentally lost from prescribe fire operations. Implementation of the project will not have measurable impacts to Pallid or Fringed Myotis bat habitat.

There will be no reduction in overall Townsends big-eared bat habitat across the Deschutes National Forest. Therefore implementation of this project will not contribute to a negative trend in viability for this species on the Deschutes National Forest.

North American Wolverine

Measure: Effects to denning habitat and dispersal habitat

Existing Condition

The wolverine is a federal Candidate species, a Regional Forester Sensitive Species and a Deschutes LRMP Management Indicator Species. On February 4, 2013, the FWS proposed it for listing as a threatened species under the ESA primarily due to shrinking mountain spring snowpack as a result of climate change (USDI Fish and Wildlife Service 2013). On August 13, 2014 the Fish and Wildlife Service withdrew the proposed rule to list the distinct population segment of the North American wolverine occurring in the U.S. as a Threatened species.

Wolverines are primarily scavengers but also depend on a variety of prey items. In winter, they tend to den in the ground under snow or in rocky ledges or talus slopes (Ingram 1973). However, Copeland (1996) found they tended to prefer montane coniferous forest habitats during the winter. Wolverines make little use of young, thick timber and clear-cuts (Hornocker and Hash 1981).

Hornocker and Hash (1981) concluded that wolverine populations should be treated as regional rather than local whereas Edelman and Copeland (1999) suggested that wolverine populations move along corridors of mountainous habitats and that features such as the Columbia River Gorge and shrub-steppe habitats serve as barriers to dispersal. They also concluded that sightings occurring across the arid mountains of Central Oregon may suggest a movement corridor from the Cascade Mountains to the Wallowa Mountains.

Several historic sightings have been documented on the Sisters Ranger District near Suttle Lake and within the Mt. Jefferson and Mt. Washington wilderness areas. Two aerial flights were conducted in the Three Sisters, Mt. Washington, and Mt. Jefferson wilderness areas and adjacent roadless areas on the Sisters Ranger District 1998 and 1999. There were no detections during the two flights. Baited camera systems placed near the wilderness boundary from 1997 through 1999 did not detect wolverine presence.

During the winter of 2012/2013 and 2013/2014 a research monitoring project using motion-detection cameras at bait stations and a hair snag system to collect samples for genetic analysis occurred on the Deschutes and Willamette National Forests. Target forest carnivores included the wolverine, the American marten, and a montane subspecies of red fox (Vulpes vulpes sp.). No wolverines were detected during this six month study.

A habitat assessment for the wolverine on the Deschutes National Forest was completed in 2012. Denning habitat was modeled from the Forest GIS Plant Association Group (PAG) layer including the alpine dry, alpine meadow, glacier and rock, north aspect of 0-22.5 degrees and 337.5-360 degrees. The results from this were clipped using only the acres above 5500 feet in elevation. Of the 1,656 acres of wolverine denning habitat modeled for the Deschutes National Forest, 64 acres are in the Deep Canyon watershed. All of these acres are within designated wilderness areas, primarily in the Three Sisters wilderness area, with small areas in the Mount Jefferson wilderness area. No denning habitat occurs in the Melvin Butte project area.

Wolverines appear to be extremely wide-ranging and unaffected by geographic barriers such as mountain ranges, rivers, reservoirs, highways, or valleys. Wolverines were documented using burned areas in Idaho (Copeland 1996) from immediately after the fire to up to several years after the event, presumably following ungulate herds. On the Deschutes National Forest, wolverine may travel through and or forage infrequently at lower elevations on the district but utilize higher elevations for most of their needs. Potential dispersal habitat occurs within the project area.

Alternative 1 (No Action)—Ecological Trends

Under Alternative 1 (No Action), current management plans would continue to guide management of the project area. No thinning or mistletoe treatment would occur. No mowing or prescribed burning would occur to reintroduce natural fire back into these ecosystems as well as reducing fuel loads in the project area. No road closures or decommissioning would occur to reduce disturbance to wolverine prey species.

Habitat conditions would remain the same for the short-term. Stand densities would continue to increase due to fire suppression. With increased stand densities comes increased risk of loss from disturbance events (insects, disease, or fire). These events would likely impact the densest stands the greatest due to the stand conditions which would result in reduced availability of suitable habitat for prey species that utilize the project area.

Overall, since the project is not associated with wolverine habitat, the continuing ecological trend will not impact the wolverine or its habitat. However, the no action alternative could reduce available habitat for prey species within the project area.

Direct and Indirect Impacts—Alternatives 2 and 3

The action alternatives would not remove any suitable habitat for the wolverine. Habitat identified within the watershed is not associated with the project area, therefore there will be no direct or indirect impact to the wolverine or its habitat.

Approximately 14 miles of road are proposed to be closed and decommissioned under all action alternative. This will reduce road densities in the project area from 5.98 mile/sq. mile to 4.66 miles/sq. mile. Road closures are not associated with suitable habitat, however by reducing road densities it will reduce the amount of motorized disturbance to the project area. Road closures could potentially enhance the ability for wolverine to disperse through the project area.

There would be ***No effect*** to the wolverine or its habitat under Alternatives 2 or 3.

Project Design Criteria/Mitigation Measures—Alternatives 2 and 3

None.

Cumulative Effects—Alternatives 2 and 3

The cumulative effects area for the wolverine is the Deep Canyon watershed. Because there are no direct or indirect effects to the wolverine from the Melvin Butte project, there would be no cumulative effects to the wolverine.

Conclusion— Alternatives 2 and 3

The Melvin Butte project would have no direct and indirect effects to the wolverine or its habitat. There are no ongoing and reasonably foreseeable cumulative effects to the wolverine. Alternatives 2 and 3 would not lead to a trend towards Federal listing for the wolverine. Alternatives 2 and 3 are consistent with the standards and guidelines in the Deschutes National Forest LRMP as amended by the NWFP.

Lewis's woodpecker

Existing Condition

Formerly widespread, this species is common year-round only in the white oak ponderosa pine belt east of Mt. Hood. Habitat for the Lewis' woodpecker, a migrant in this part of its range, includes old-forest, single-storied ponderosa pine. Burned ponderosa pine forests created by stand-replacing fires provide highly productive habitats as compared to unburned pine (Wisdom et al. 2000). Lewis' woodpeckers feed on flying insects and are not strong cavity excavators. They require large snags in an advanced state of decay that are easy to excavate, or they use old cavities created by other woodpeckers. Nest trees generally average 17 to 44 inches (Saab and Dudley 1998, Wisdom et al. 2000). Known breeding has been documented in low numbers along Why-chus Creek (Marshall et al. 2003) and in recent burned areas across the Deschutes.

In evaluating landscape predictor variables for the Lewis's woodpecker, Saab et al. (2002) found a negative relation to burned ponderosa pine/Douglas-fir stands with high crown closure (>70%) but was

positively associated with low snag densities overall. However, although it selects for more open stands, this species selected nest sites with higher densities of large snags (>20"dbh) (Saab and Dudley 1998). Lewis' woodpeckers are different than other woodpeckers. They are aerial insectivores during the breeding season and use lower densities of smaller snags but rely more heavily on large snags (Saab and Dudley 1998). Habitat for Lewis' woodpecker will increase 5-10 years after in fire areas as smaller snags fall.

The Lewis' woodpecker is declining throughout its range. Threats to this species include the loss of suitable habitat, competition for nest trees, and effects of pesticides on insects.

Abele et al. (2004) completed a Technical Conservation Assessment for the Rocky Mountain Region of the Forest Service. During the Assessment perceived threats to the conservation of the Lewis' woodpecker were identified:

1. The loss of breeding and wintering habitats in burned pine forests, park-like pine forests, riparian cottonwood stands, and woodlands.
2. Natural disturbances and management activities associated with them. For example a wildfire followed by salvage logging.
3. Fire Suppression within pine forests that have increased canopy cover (including increase of white fir) and reduced shrub and grass understories, which reduces insect populations that Lewis' woodpecker forage on and reduced aerial foraging areas.
4. Water regulation, which has altered riparian woodlands in the last two centuries.
5. Cattle grazing by altering the historic fire regimes with a reduction of understory vegetation. In addition, altering understory can influence the composition and abundance of prey.
6. Firewood cutting by reducing potential nest sites.
7. Competition with European starling and other cavity nesting species for nest sites.

Through the Forest wide assessment completed for MIS, Lewis' woodpecker reproductive habitat was mapped across the entire Deschutes National Forest. Habitat assessed for the Lewis woodpecker is associated with both green stands and post fire habitats. Approximately 122 acres of habitat occurs within Melvin Butte, 1,405 acres in the Deep Canyon Watershed, and approximately 85,015 acres of habitat occurs across the Deschutes National Forest (See Table 21)

Table 21: Lewis woodpecker habitat within the Melvin Butte project area, Deep Canyon Watershed, and across the Deschutes National Forest.

Acres of Habitat in the Melvin Butte project area	Acres of Habitat in the Deep Canyon Watersheds	Acres of Habitat Across the Deschutes National Forest
122 acres	1,405 acres	85,015

For the detailed assessment on the Lewis' woodpecker for the Deschutes National Forest, see the Forest-wide Species Assessment (USFS 2012).

There are no known Lewis' woodpecker nest sites within Melvin Butte project area.

Measure: Lewis' woodpecker habitat change in quality due to thinning and removal of fire killed trees in Scenic Views corridor.

Environmental Consequences

Alternative 1 – No Action (Ecological Trend)

Without treatment the development of future old growth within second growth ponderosa pine and mixed conifer stands would be prolonged and the existing old trees within the would continue to be stressed, decreasing their longevity. However, stands would continue to provide habitat in the short-term. In the long-term, if a stand replacing wildfire or insect outbreak hasn't occurred, the stands containing disease would continue to die and the multi-storied structure would diminish along with any remnant old growth trees. Due to stand densities within the project area and increases in mortality overtime, the risk of large scale stand replacing fire across the Melvin Butte project area also increases over time.

Stand resilience to insects and disease, is measured by the Upper Management Zone (UMZ) . The UMZ relates to the density of trees (basal area, trees per acre, etc.) a forest stand can support without significant mortality from bark beetles. The upper management zone is the density level at which trees begin to come under significant stress and can become susceptible to bark beetles and other insects and diseases. Forest stands managed below the upper management zone are more resilient. Since UMZ is a measure of stand density, those stands that are above UMZ are very densely stocked and therefore can also indicate stands that are at risk of stand replacing fire. There are approximately 4,456 acres that have the potential to receive vegetation treatment. Under the existing condition/no action 92% of these stands are above the Upper Management Zone and are at risk or currently be impact by insects and disease due to high stand densities and as a result low resiliency. Under the No Action Alternative, no treatments will be prescribed within Melvin Butte project area (5,375 acres). However, the "ecological trend" in the short-term is that these stands would continue to remain suppressed and at risk of a stand-replacing wildfire.

Overall, high stand densities will result in a decrease in tree vigor among all size classes. The most significant effect of high stand densities will be the gradual loss of the existing historic large-tree component/nesting habitat which is likely to occur at a much higher rate than if stand densities were reduced to more healthy levels.

Areas that currently provide suitable Lewis habitat will persist in the short-term, since this species prefers open ponderosa pine stands or post fire environments, and will likely remain open for the next 15 years. Without the treatments prescribed to thin from below within multi-storied ponderosa pine and mixed conifer stands, stand densities and the associated intraspecific competition among trees in the stands will reduce the longevity of residual old growth and large tree structure that occurs in these stands. In the long-term, available nest trees will be limited and the future development of large nest trees will be prolonged. In high density stands of second growth ponderosa pine containing mistletoe, in the short-term the mistletoe will reduce the resiliency of these stands against bark beetle attack. In the long-term, the second growth stands will likely contain bark beetle outbreaks and high densities of small snags that result in lack of recruitment of large tree structure over time, limiting suitable nesting habitat.

Alternative 2 and 3 - Direct and Indirect Effects

Thinning From Below (HTH)

Under the proposed treatment types, both action alternatives prescribe thinning from below in Lewis' woodpecker habitat. The habitat exists as second growth ponderosa pine stands in an advanced stage of development where the majority of trees are reaching maturity. In addition, there are residual old growth stands of ponderosa that will be thinned. These areas provide the most suitable habitat and will be greatly

enhanced by thinning from below. On average trees identified for thinning will be approximately 12-14 inches dbh, with secondary non-commercial treatments removing trees 8 inches dbh and less. Thinning from below will retain the largest healthies trees in the stand. These treatments will reduce stand densities, minimizing the risk of mountain pine beetle outbreaks, and stand replacing fire. This treatment aids in the maintenance of large trees by reducing their susceptibility to fire and insects while reducing competition for space and nutrients. Due to density reduction in the understory, stands will be more open accelerating the development of LOS ponderosa pine and the recruitment of large snags over the next 30+ years.

Prescribed Fire (Burn)
Primary and secondary treatments include mowing and burning. Mowing is designed to reduce shrub densities that contribute to ladder fuels and breakdown residual thinning slash. Similarly, burning is also designed to reduce shrub densities and thinning slash that contributes to ladder fuels, burning may risk losing existing large snags that provide nesting habitat. In addition, through burning operations additional snags could potentially be recruited to provide nesting habitat in the short-term. Prescribed burn only treatments will not receive thinning, while thinning from below will receive secondary treatments of mowing and burning. There is no difference in effect to habitat as a result of either treatment both treatments have the potentially to recruit snags from burning operations providing habitat in the short-term for Lewis' woodpecker. However, prescribed burning also has the potential to remove large soft snags that provide suitable Lewis' woodpecker nesting habitat in the short-term.

See the DecAid snag and down wood analysis in the Wildlife Report for a summary of the dead wood habitat assessment.

Table 22: Total Acres of Lewis' Woodpecker Habitat Associated with each Treatment Type by Alternative

Treatment Type	Alternative 2	Alternative 3
HTH	13	13
B	96	96
Total Acres	**109**	**109**

Affects to Lewis' woodpecker habitat are similar under Alternative 2 and 3. The outcome or long-term benefits to habitat as a result of the effects of each treatment type is also similar across all action alternatives.

Alternatives 2 and 3 similarly address the risk of insect disease, and stand replacing fire, both promote burning and mowing to maintain existing open ponderosa pine stands that need minimal thinning. Both alternatives will promote Lewis' woodpecker habitat by using prescribed fire to create individual fire killed trees which these woodpeckers prefer for nesting, while maintaining habitat continuity across the project area, and promoting the development of future fire resistant stands of LOS ponderosa pine containing future nesting habitat. Although treatments will enhance habitat, not every fire killed trees greater than 17 inches dbh will provide suitable nesting habitat. Habitat is highly dependent on the spatial arrangement of suitable snags for nesting and their proximity to open areas that the Lewis' woodpecker needs for foraging. Treatments prescribed under both alternatives will promote spatial heterogeneity in these stands, retaining the largest trees in the stands providing a mosaic of tree densities. Residual trees will contain a variety of size classes providing residual foraging habitat as well as maintaining late and old structure to provide nesting habitat where it exists.

Overall, approximately 109 acres of Lewis' woodpecker reproductive habitat are associated with treatments identified under Alternatives 2 and 3. Treatments will not target the removal of large trees or

snags and therefore will not impact habitat in the short-term. Burning associated with treatments could potentially recruitment some large snags providing nesting habitat in the long-term as snags decay. Mortality of snags in ponderosa pine habitat during prescribed fire treatments in Arizona and California ranged from 20% (Randall-Parker and Miller 2002), 45% (Horton and Mannan 1988), and 56% (Bagne et al. 2008). All three studies found that larger diameter ponderosa pine trees were least likely to die, at least in the short-term. Horton and Mannan (1988) found a 20-fold increase in abundance of snags < 15 cm dbh. Several studies showed that the highest snag losses were in areas where a long period of fire exclusion had occurred (Bagne et al. 1988, Holden et al. 2006). Bagne et al. (2008) and Horton and Mannan (1988) found that re-entry burns had a much lower mortality rate for snags, presumably because the trees that did not burn during the first entry were more resilient. Loss of snags from prescribed fire was partially mitigated by the creation of new snags (Horton and Mannan 1988, Bagne et al. 2008). Similarly outcomes are expected with the Melvin Butte project. The majority of these stands have not been burned for decades and this will be the first entry with prescribed fire. The goal of the project is to promote and enhance LOS ponderosa pine habitat within stands identified as Lewis' woodpecker habitat. However, only approximately 2% of the project area is associated with Lewis woodpecker habitat treatments.

Cumulative Effects—Alternatives 2 and 3

Activities identified in Table 1 (Cumulative effect table for wildlife) were reviewed to assess whether, in combination with the likely impacts of the Melvin Butte project, there would be any cumulative impacts to Lewis' woodpecker reproductive habitat. The Deep Canyon Watershed is being used as the scale for analysis for this species. Based on that review, the potential cumulative impacts are those discussed below.

Two large wildfires have occurred within the Deep Canyon Watershed –Rooster Rock (2010) and Pole Creek (2012) Approximately 58 acres of salvage occurred where the fires are associated with the Deep Canyon watersheds leaving the majority of these fires as habitat. Danger tree removal occurred on the fires mentioned above to varying degrees resulting in a reduction of potential nest sites in stand replacement areas along main roads.

Activities proposed under the Pole Creek Fire Timber Salvage, Two Bulls Timber Salvage, Ursus Hazardous Fuels Reduction project, Bend Municipal Watershed Fuels Reduction project, and Forest Road 370 Fuels Reduction project have occurred or may occur in suitable habitat.

The Pole Creek Fire Timber Salvage is ongoing and approximately 54 acres of stand replacing fire areas are being salvage logged with the watershed. Treatments were designed to enhance Lewis woodpecker habitat by retaining 6 snags per acre that will provide the most suitable habitat for the woodpecker. Danger trees associated with the Pole Creek Fire that provide snag habitat will also be removed along 42 miles of road. The total area of danger tree removal is approximately 350 acres. Approximately 250 acres are proposed for salvage within stand replacing areas of the Two Bulls Fire.

The Ursus and Bend Municipal Watershed Hazardous Fuels reduction projects focus primarily on removing dead and live lodgepole pine, as well as white-fir among green stands to reduce fuel loading. There are approximately 6300 acres associated with these projects, neither of these projects proposes to reduce elements associated with Lewis woodpecker habitat.

Private lands are not managed for woodpecker habitat. Therefore, it is assumed that any habitat provided by these parcels is incidental and may not be long term.

Approximately 1,405 acres of Lewis' woodpecker reproductive habitat exist within the Deep Canyon watershed. The Melvin Butte project under Alternatives 2 and 3 proposes to treat approximately 109 acres of suitable reproductive habitat.

Although treatment will not reduce suitable nest trees, treatments are proposed within 7% of the total Lewis' woodpecker habitat within the Deep Canyon watershed, habitat for this species will remain within the 109 acres associated the Melvin Butte project. Habitat quality will be enhanced as well as habitat utility for this species. With the ongoing forest management projects within the Deep Canyon watershed there will be less than a 1% reduction in the overall habitat for the Lewis" woodpecker across the Deschutes National Forest.

Conclusion

Cumulatively, with the ongoing forest management projects within the Deep Canyon Watershed, this project impacts less than 1% of suitable habitat across the Forest, the overall direct, indirect and cumulative effects will result in a small negative trend of habitat (increase in disturbance). The loss of habitat (increase in disturbance) will be insignificant at the scale of the Forest. The Melvin Butte Project is consistent with the Forest Plan, and thus continued viability of species A is expected on the Deschutes National Forest.

Alternatives 2 and 3 ***May Impact*** the Lewis' woodpecker as a result of nest disturbance and through the incidental loss of nesting snags during implementation.

Landbird Conservation Strategy Consistency

Biological objectives are all based on "where ecologically appropriate" meaning actions must occur within the proper habitat addressed in order to be consistent or not.

Species	Biological Objectives	Consistent Yes, No, or NA	Rationale
Lewis' Woodpecker **In Ponderosa Pine Stands:**	Through natural events or management, maintain >1% of landscape as post-fire old ponderosa pine forest habitat	NA	There are no treatments associated with post fire ponderosa pine habitats
	Through natural events or management, maintain >50% of the post-fire landscape as unsalvaged	NA	There are no post-fire salvage treatments associated with the project.
	Where salvage is occurring in post-fire old ponderosa pine forest, (in burns >100 acres) salvage <50% of the standing and down dead	NA	This is not a salvage logging project.
	Where salvage is occurring in post-fire old ponderosa pine forest, (in all burns) retain all trees/snags >20"dbh and >50% of those 12-20" dbh	NA	This is not a salvage logging project.
Lewis' Woodpecker **In Ponderosa Pine Stands**	In all burns, snags should be clumped and hard and soft decay classes left to lengthen period of suitable habitat	NA	Project does not propose to remove snags in Lewis woodpecker habitat.
	In old forest habitat, provide 24 snags/acre >9"dbh and of these 6	Not	No snags will be removed in old forest ponderosa pine habitat.

	snags/acre should be >20"dbh	Applicable	
	In old forest habitat, provide recruitment snags especially in areas of high risk stand replacement fire	Meets	In old forest ponderosa pine habitat, all residual green old growth will be retained
	In old forest habitat, provide shrub understory of >13% cover	Meets	Wildlife retention will occur with this habitat type that will remain untreated.

Mitigation Measures: None

Recommendations:

1. To avoid potential nest destruction and loss of broods, schedule harvest and post harvest activities outside of nesting season in appropriate habitat (March 15 through June 30).

White-headed Woodpecker

Existing Condition

White-headed woodpeckers are uncommon permanent residents in forests east of the Cascades. They use habitat with large open ponderosa pine, low shrub levels and large snags. Dixon (1995) found white-headed woodpecker densities increased with increasing old-growth ponderosa pine trees and showed a positive association with large ponderosa pine. The white-headed woodpecker is a primary cavity excavator of soft snags. This woodpecker is the only woodpecker species to rely heavily on seeds of ponderosa pine for food (Marshall et al. 2003 p. 364).

White-headed woodpeckers may require dynamic landscapes with both burned and unburned habitat for the long-term persistence of populations (Hollenbeck et al. 2010). Wightman et al. (2010) found existing open-canopied ponderosa pine forests before a fire and a mosaic of burn severities within 1 kilometer of nests was found to characterize nest sites on the Fremont-Winema NF. They found the presence of larger, more decayed snags and fewer live trees near a snag (within 1 hectare) after fire were important factors for nest selection, however this didn't influence nest survival. Open-canopied pine forests with mature, cone-producing trees within proximity of burns were also important in identifying white-headed woodpecker habitat as long as most of the landscape was not subjected to stand replacement burns (Wightman et al. 2010). A mosaic of burn severities across the landscape may improve white-headed woodpecker habitat by opening forest canopies in higher severity burned areas while retaining decayed snags created before wildfire and live cone-producing trees in unburned or low severity burned areas (Wightman et al. 2010).

A long term study on the white-headed woodpecker occurred on the Deschutes and Winema National Forests from 1997-2004 with several Deschutes study sites occurring in the Metolius Basin area. Frenzel (2000) calculated the mean diameter for white-headed woodpecker nest trees to be 26.2"dbh while Dixon (1995) found similar results (mean diameter of 25.6"dbh). Frenzel (2003) found nests at sites with a high density of large diameter trees had a higher survival rate than nests in recently harvested sites. Unharvested sites or sites with greater than 12 trees per acre >21"dbh had a success rate of 63.1% while nests at previously harvested sites or lower densities of large trees had a success rate of 39.8%. Therefore, white-headed woodpeckers were positively associated with higher densities of large trees. On

the Winema National Forest, white-headed woodpeckers were found to be using small-diameter trees, logs in a slash pile and upturned roots (6-13"dbh) where large snags were uncommon (Frenzel 2002).

White-headed woodpeckers roost in ponderosa pine habitats with an average canopy closure of 57.4 + 1.9% canopy closure (Dixon 1995). In addition, most (65%) roost sites were located on flat ground and found on the lower one-third of the slope or bottom slope (89%) with slopes ranging from 0-40% and an average of 7 + 1% (Dixon 1995). Roost site elevations ranged from 2900-4311 feet with an average elevation of 3382 + 39 feet (Dixon 1995).

Snags and live trees used for roosts were greater than snags and live trees found within plots (Dixon 1995). Roost trees diameters averaged 24 + 1" dbh and ranged from 7 to 45" dbh while heights ranged from 6 to 164 feet and averaged 66 + 3 feet tall (Dixon 1995). Tree diameter at cavity height ranged from 2 to 30" in diameter and averaged 17 + 2" dbh while cavity heights averaged 8.6 + 1 feet tall and ranged from 5.5 to 20 feet (Dixon 1995).

Dixon (1995) found white-headed woodpeckers did not use the same kind of tree for nesting as they did for roosting. Nest trees were typically dead, had broken tops, were shorter in height, contained more cavities, and had a higher percentage of bark present than roost trees. She also found they used different decay stages for nesting than roosting. See Table 23 for a comparison of decay classes used for nesting and roosting found by Dixon (1995).

Table 23: Nest and Roost Tree Decay Class Comparison for White-headed Woodpecker(Dixon 1995).

Decay Class	Nest Tree Percentage	Roost Tree Percentage
Decay Class 1 (Recently Dead)	25%	11%
Decay Classes 2-3 (Moderately Decayed)	51%	34%
Decay Classes 4-5 (Advanced Decay)	25%	55%

Foraging habitat is usually found in association with nesting habitat. Kozma (2011) surmised because white-headed woodpeckers are primarily bark gleaners and feed on ponderosa pine seeds throughout the winter, large diameter and old-growth ponderosa pine may be more important to white-headed woodpeckers because these trees have a greater bark foraging area, higher insect abundance, and greater and more frequent cone production than smaller trees.

Dixon (1995) found 42% of over 2,000 foraging observations were on branches, 23% on the upper trunk, 22% on the mid-trunk, and 13% on the lower trunk with an average foraging height of 62 feet on large diameter live ponderosa pine trees. Dixon (1995) also showed that white-headed woodpeckers gleaned 35%, fed on cones 31%, pecked 24%, and fed on sap 7% with males foraging slightly higher in trees and feeding on cones more than females.

White-headed woodpeckers feed on tree sap (Dixon 1995, Kozma 2010) as well as insects and seeds. White-headed woodpeckers are weak excavators and this may explain the use of smaller trees for sap feeding. It may be easier for them to drill wells in thinner bark of smaller ponderosa pine compared to thicker, furrowed bark of larger pine (Kozma 2011).

Table 24: Comparison of Sap and Non-used Trees for White-headed Woodpecker(Kozma 2010).

Trees	Mean Height (feet)	Height Range (feet)	Mean Diameter (dbh inches)	Diameter Range (dbh inches)

Sap Trees	44	44.6 – 72.5	8.8	2.4 – 14.6
Non-used Trees	54	9.1 – 96.4	12.2	2.0 – 23.3

Threats to this species include increased stand densities in ponderosa pine due to fire suppression, loss of large, old ponderosa pine trees and snags, wildfire, and increased shrub densities. Increased shrub densities may be factors leading to increased mammalian nest predation and increased risk of avian predation on adults (Frenzel 2000).

White-headed woodpecker nest monitoring occurred from 2003 to 2011 in similar treatment types associated with the Metolius Basin project (DNF 2011) as are prescribed in the Melvin Butte project. The monitoring found that resident birds were not displaced by short-term impacts associated with the implementation of treatments resulting in nests that were successful. In addition, due to stand density reductions, nests were more successful due to the increase in suitable habitat.

The NatureServe status for the white-headed woodpecker is apparently secure at the global and national levels (G4 and N4) and imperiled at the state level (S2).

Through the Forest wide assessment completed for MIS, white-headed woodpecker reproductive habitat was mapped across the entire Deschutes National Forest. Habitat assessed for the white-headed woodpecker is associated with both green stands and post fire habitats. Habitat for the white-headed woodpecker occurs sparingly throughout the Deschutes National Forest in the following plant associations –ponderosa pine, Douglas-fir, white fir, and Shasta red fir in open stands where average tree size is 20"dbh or greater. Approximately 316 acres of habitat currently exists within the Melvin Butte project area. Approximately 1,272 acres of habitat occurs within the Deep Canyon watershed and approximately 198,330 acres of habitat across the Deschutes National Forest. (See Table 25).

Table 25: White-headed Woodpecker Reproductive Habitat within the Melvin Butte Project Area, Deep Canyon Watershed, and Across the Deschutes National Forest.

Acres of White-headed Woodpecker Habitat in the Melvin Butte project area	Acres of White-headed Woodpecker Habitat in the Deep Canyon Watershed	Acres of White-headed Woodpecker Habitat Across the Deschutes National Forest
316 acres	1,272 acres	198,330 acres

For the detailed assessment on the white-headed woodpecker for the Deschutes National Forest, see the Forest-wide Species Assessment (USFS 2012).

There have been four documented observations of white-headed woodpeckers from 1999 to 2002 in the project area. During the 2010 field season, two nest sites were located in the Melvin Butte project areas as a result of nest survey conducted during the 2010 Hollenbeck et al. white-headed woodpecker research project that occurred on the Sisters Ranger District.

Measure: White-headed woodpecker habitat change in quality due to thinning and prescribed burning operations.

Environmental Consequences

Alternative 1 – No Action (Ecological Trend)

Stand resilience to insects and disease is measured by the Upper Management Zone (UMZ). The UMZ relates to the density of trees (basal area, trees per acre, etc.) a forest stand can support without significant mortality from bark beetles. The upper management zone is the density level at which trees begin to

come under significant stress and can become susceptible to bark beetles and other insects and diseases. Forest stands managed below the upper management zone are more resilient. UMZ can also be used to estimate which stands are more susceptible to stand replacing fire by identifying those stands that are above the Upper Management Zone. There are approximately 4,456 acres that have the potential to receive vegetation treatment. Under the existing condition/no action, 92% of these stands are above the Upper Management Zone and are at risk or could currently be impact by insects and disease due to high stand densities. Under the No Action Alternative, no treatments will be prescribed within Melvin Butte project area (5,375 acres). However, the "ecological trend" in the short-term is that these stands would continue to remain suppressed and at risk of a stand-replacing wildfire.

Due to stand densities within the project area and increases in mortality overtime, the risk of large scale stand replacing fire across the Melvin Butte project area also increases over time, potentially impacting high density stands. In the short-term, an event like this could provide some nesting and foraging habitat but the majority of the areas would not. Since these stands are predominantly 60-80 year old second growth ponderosa pine, snags recruited from the fire would be small with an average diameter of 14 inches. Since the majority of burned trees would be small diameter, most of the fire killed trees would fall in the first 10 years and many areas would be void of nesting habitat in the long-term. If nesting habitat existed it would be limited on the landscape.

Currently, high stand densities will result in a decrease in tree vigor among all size classes. The most significant effect of high stand densities will be the gradual loss of the existing historic large-tree component/nesting habitat which is likely to occur at a much higher rate than if stand densities were reduced to more healthy level.

Areas that currently provide suitable white-headed woodpecker habitat will persist in the short-term, since this species prefers open ponderosa pine stands. Without treatments prescribed to thin from below within multi-storied ponderosa pine and mixed conifer stands, stand densities will reduce the longevity of residual old growth and large tree structure that occurs in these stands. In the long-term, available nest trees will be limited and the future development of larger nesting trees will be prolonged. In high density stands of second growth ponderosa pine containing mistletoe, in the short-term the mistletoe will reduce the resiliency of these stands against bark beetle attack. In the long-term, the second growth stands will likely contain bark beetle outbreaks and high densities of small snags. Therefore there will be a lack of recruitment of large tree structure over time, limiting suitable nesting habitat for the white-headed woodpecker.

Alternative 2 and 3- Direct and Indirect Effects

Suitable habitat occurs in residual stands of late and old structure ponderosa pine which occur at mid elevation in the northern portion of project area. Most of the ponderosa pine stands within the project area typically unsuitable because they are densely stocked second growth "black bark" that lack soft snags which provide nesting habitat.

Thinning From Below (HTH)

Thinning in suitable reproductive habitat would occur in both second growth ponderosa pine and multi-storied ponderosa pine and mixed conifer stands. Thinning (from 8" dbh and up) from below will favor the largest ponderosa pine in pure pine stands. In mixed conifer stands, thinning will favor ponderosa pine and healthy white-fir. A basal area of 40 – 120 square feet will remain on average in each stand. Treatment aids in maintaining large trees by reducing their susceptibility to fire and insects by reducing competition for space and nutrients. Thinning decreases stand densities and allows for faster growth of residual trees while reducing risk of stand replacing fire (removal of ladder fuels). Due to density

reduction in the understory, stands will be more open accelerating the development of LOS ponderosa pine and recruiting large snags that the white-headed woodpecker specifically select for nest sites.

Within mixed conifer stands, thinning will favor ponderosa pine focusing removal on smaller diameter white-fir and lodgepole pine. Favoring ponderosa pine will promote more fire resilient stands in the future, as well as reduce the risk of insects and disease that are common to white-fir and lodgepole pine by reducing the abundance of these species in the stands. Although the treatments promote ponderosa pine, residual green white-fir and lodgepole pine will exist in these stands, however they are both short-lived species compared to ponderosa pine and typically recruited as snags at a higher rate due to their susceptibility to insects and disease. It will likely be the lodgepole pine and white-fir that more readily provide nesting habitat over the long-term as large ponderosa pine develop and are recruited as nesting habitat.

Overall residual trees will retain a variety of seral classes providing foraging habitat as well as maintaining late and old structure to provide nesting habitat. Treatments prescribed will promote heterogeneity in these stands, retaining the largest trees and providing mosaic of tree densities. Treatments will be beneficial to the white-headed woodpecker, by opening stands up around available nest sites, it will allow for greater predator avoidance and promote higher nest success.

Prescribed Fire (Burn)

Secondary fuels treatments include mowing and burning to reduce shrub densities and residual thinning slash in the understory. Mowing will potentially reduce rodent populations, promoting the likelihood of nest success. Similarly, burning will also reduce rodent habitat, but will also recruit snags in the short-term providing potential nesting habitat. However, since white-headed woodpecker are weak excavators and dependent on soft snags for nesting, the utility of newly created snags will be limited until they decay to a point that is conducive to excavation. Within black bark ponderosa pine stand that are 60 to 80 year second growth, snags recruited from prescribed burning will range between 14-20 inches dbh. Although these newly created snags are on the small end for nesting, snag densities are low in these stands and very few snags exist over 21inches. Currently, ue to the lack of nest site availability, these newly created small diameter snags may provide the only available nesting habitat in the short-term.

Non-commercial Thinning (P)

In addition, some ponderosa pine plantations that contain individual large diameter ponderosa pine provide some foraging habitat for the white-head woodpecker will be thinned. These plantations will be thinned to accelerate development by reducing competition. White-headed woodpeckers primarily forage by gleaning insects from under the bark of large ponderosa pine but will also excavate sap wells in second growth or young ponderosa pine (Dixon 1995, Kozma 2010). These treatments will reduce some foraging habitat, but a fully stocked stand will remain after treatment. Treatments are intended to reduce stocking density, to promote the development of overstory stands, and reduce the likelihood of losing these trees to bark beetle infestation. Treatment will retain residual foraging opportunities.

Scenic Views Enhancement

Habitat associated with this treatment type occurs in the mixed conifer plant association group. This treatment occurs in stands along the 16 road corridor that were burned in the Pole Creek fire. The majority of this treatment type occurs in the lodgepole pine plant association group. Treatment will be focused on the removal of dense stands of dead lodgepole pine to reduce dead wood densities that will create a fuel hazard in the future. Ponderosa pine is limited in this area and exists primarily as individuals. This area provides both nesting and foraging options due to post fire habitat. Where large dead ponderosa pine exists they will be retained for wildlife habitat. No green trees of any species will be removed within this treatment area. Treatments will remove small dead trees from the vicinity of large

dead ponderosa pine. The treatment will primarily focus on the removal of trees that are small in size and do not provide nesting utility of the white-headed woodpecker and therefore will not remove habitat.

See DecAid snag and down wood analysis in the Wildlife Report for a summary of the dead wood habitat assessment.

The following table 26 provides a summary of the total treatment acres associated with to suitable white-headed woodpecker habitat by alternative.

Table26: Total Acres of Reproductive Habitat Associated with Each Treatment Type by Alternative for the Melvin Butte Project Area

Treatment Type	Alternative 2	Alternative 3
B	83	83
HTH	29	34
P	151	151
Scenic Views Enhancement	39	39
Total Acres.	**302**	**302**

Affects to white-headed woodpecker habitat are similar under Alternative 2 and 3. The outcome or long-term benefits to habit as a result of the effects of each treatment type is also similar across both action alternatives.

Alternatives 2 and 3 similarly address the risk of insects, disease, and stand replacing fire, as well as promote stand level heterogeneity. Both alternatives promote habitat diversity due to the variety of stand densities stands will be thinned at with the objective of promoting habitat for a variety of species associated with ponderosa pine and mixed conifer dry PAG's. Both alternatives will create a landscape mosaic of thinned and un-thinned habitat, maintaining habitat continuity across the project area, while promoting the development of future fire resistant stands of LOS ponderosa pine. Residual trees will retain a variety of seral classes providing residual foraging habitat as well as maintaining late and old structure to provide nesting habitat where it exists.

To assist with promoting diversity and variability on the landscape within the ponderosa pine and mixed conifer dry PAG's, approximately 33 % of the project area will be left untreated. Residual untreated areas will be left as entire stands with an occasional small aggregate patch.

Overall, approximately 302 acres of white-headed woodpecker reproductive habitat are associated with treatments identified under Alternatives 2 and 3.

Cumulative Effects—Alternatives 2 and 3

Activities identified in Table 1 (wildlife cumulative effects table) were reviewed to assess whether, in combination with the likely impacts of the Melvin Butte project, there would be any cumulative impacts to white-headed woodpecker habitat which is associated with ponderosa pine and mixed conifer stands containing late and old structure ponderosa pine. These activities were reviewed across the Deep Canyon watershed to determine cumulative impact to the white-headed woodpecker.

Two large wildfires have recently occurred within the Deep Canyon Watersheds –Pole Creek and Rooster Rock totaling approximately 5,411 acres. Approximately 54 acres of salvage is occurring within the Pole

Creek fire therefore leaving the majority of the majority of the fire associated with the watershed as habitat (<1% of the fires associated with the watershed). Danger tree removal occurred on the fires mentioned above to varying degrees resulting in a reduction of potential nest trees in stand replacement areas along main roads.

Ursus Hazardous Fuels Reduction project, Bend Municipal Watershed Fuels Reduction project and Forest Road 370 Fuels Reduction project, are primarily associated with montane mixed conifer habitat and lodgepole pine these project totaling approximately 7,355 acres. These projects are not likely associated with white-headed woodpecker habitat and therefore will not likely contribute to cumulative effects.

The Three Creeks personal use firewood cutting area also occurs in the watersheds. This area occurs in both Eastside Mixed Conifer (EMC) and lodgepole pine habitat types. Firewood cutting is not wide spread and primarily occurs where dead trees can be accessed from open roads. Although snags are cut and removed, removal occurs on an individual tree basis versus across the entire designated area. The area is approximately 3,029 acres. The majority of firewood removed is associated with beetle killed lodgepole pine; impacts to white-headed woodpecker would be incidental from firewood gathering.

Private lands are not managed for woodpecker habitat. Therefore, it is assumed that any habitat provided by these parcels is incidental and may not be long term.

The thinning and burning identified with Alternative 2 and 3 are associated with approximately 24% of the total habitat within the Deep Canyon watershed. Habitat quality for white-headed woodpecker will remain throughout the Melvin Butte project area.

White-headed woodpecker habitat is predicted to increase on the Sisters Ranger District as many treatments are focused on ponderosa pine restoration, developing open grown forests with frequent underburned fires creating sustainable white-headed woodpecker habitat.

Conclusion

Cumulatively, the ongoing forest management projects within the Deep Canyon Watershed is associated with less than 1% of the overall white-headed woodpecker reproductive habitat that occurs across the Deschutes National Forest. The Melvin Butte project will improve conditions for white-headed woodpecker in the project area. Therefore, the Melvin Butte project will not contribute to a negative trend in viability on the Deschutes National Forest for the white-headed woodpecker.

Alternatives 2 and 3 ***May Impact*** the white-headed woodpecker as a result of nest disturbance and through the incidental loss of nesting snags during implementation.

Landbird Conservation Strategy Consistency

Biological objectives are based on "where ecologically appropriate" meaning actions must occur within the proper habitat addressed in order to be consistent or not.

Species	**Biological Objectives**	**Consistent Yes, No, or NA**	**Rationale**
White-headed Woodpecker **In Ponderosa Pine Stands:**	Provide a mean of 10 trees/acre >21"dbh and at least 2 trees >31"dbh	Meets	Within suitable white-headed woodpecker habitat, residual stand densities will exceed biological objectives
	Provide a mean of 1.4 snags/acre		The project does not propose to

	>8”dbh with 50% >25”dbh in a moderate to advanced state of decay	Meets	remove snag in ponderosa pine stands.
	Provide a mean canopy closure of 10-40%	Meets	Mean residual canopy closure within suitable white-headed woodpecker habitat will be 30%.
	In predominantly old-growth, provide >350 acres of contiguous habitat	Not Applicable	All old growth habitat will be retained.
	In 26-75% old-growth, provide >700 acres of contiguous habitat	Not Applicable	All old growth habitat will be retained.

Mitigation Measures: None

Recommendations:

1. To avoid potential nest destruction and loss of broods, schedule harvest and post harvest activities outside of nesting season in appropriate habitat (March 15 through June 30).

Johnson’s hairstreak

Existing Condition

This small, three-quarter inch uncommon butterfly ranges from southern British Columbia, south through eastern and western Washington, and western Oregon, to central and south California. Isolated populations exist in northeastern Oregon to central Idaho. In Oregon, it has been found sparsely in the Cascades, Coast Range, Siskiyou Mountains, Blue Mountains and Wallowa Mountains (Pyle 2002). Elevations range from sea level to 6,000 feet. Most of the 52 records for Oregon are above 2,000 feet (Hinchliff 1996). This butterfly species depends on coniferous forests that contain dwarf mistletoes (genus *Arceuthobium*) found in western hemlock, red fir, and Jeffrey pine (NatureServe 2012). Although there are not these tree species with the proposed project area, the area does contain mistletoed white fir and lodgepole pine.

Direct and Indirect Impacts—Alternative 1

The selection of this alternative would result in no immediate impact to Johnson’s hairstreak because no vegetation management actions would occur to reduce mistletoe populations. Potentially suitable habitat would be maintained based on the widespread presence of mistletoe across the project area.

Direct and Indirect Impacts—Alternatives 2 and 3

The selection of Alternative 2 would result in the specific reduction of mistleoted trees on 160 acres. On average, approximately 97% of the project area is not proposed for any treatment providing mistletoe for this species. This retention, plus leaving about 906 acres in untreated stands and not removing all mistletoe trees (but only those with the highest damage ratings) would maintain the presence of mistletoe, and Johnson’s hairstreak habitat, widely distributed across the entire 5,375 acre project area.

Alternative 3 removes less mistletoe than Alternative 2. Alternative 3 does not propose specific mistletoe treatments, it will thin stands from below containing mistletoe. This will retain more trees with mistletoe and would have a lower potential to remove Johnson’s hairstreak habitat.

Cumulative Impacts—Alternatives 2 and 3

For this species, cumulative effects were bounded by the Deep Canyon watersheds based on the limited scale of the proposed actions in relation to the size of the watersheds and availability of habitat outside of regulated timber harvest and mechanized use (e.g. wilderness and roadless areas). Past actions have been considered in the existing condition of habitat; for cumulative effects ongoing and reasonably foreseeable actions are considered.

The Bend Municipal Watershed Fuelbreak occurs along the 370 road in the Deep Canyon watersheds. The project does not impact Johnson's hairstreak habitat because it focuses on snags within 150 ft on either side of the road and minimally treats the understory of hemlock stands. The proposed actions under Melvin Butte would not have additive effects with the Bend Municipal Watershed Fuel break project.

The Three Creeks personal use firewood cutting area also occurs in the watersheds. This area occurs in both Eastside Mixed Conifer (EMC) and lodgepole pine habitat types. Firewood cutting is not wide spread and primarily occurs where dead trees can be accessed from open roads. The area is approximately 3,029 acres. The majority of firewood removed is associated with beetle killed lodgepole pine; the proposed action under Melvin Butte would not have additive impacts with personal use firewood cutting.

There would be additive effects from this project in association with the Ursus project (5,900 ac of thinning and fuels treatments including mistletoe reduction). However, the Ursus project also treats within white fir and lodgepole stands, not treating stands commonly associated with Johnson's hairstreak habitat. Additive impacts would be minimal based on the minimal treatment of mistletoe trees.

Appendix 1. Wildlife Project PDC Compliance Checklist.

Project Design Criteria Compliance Checklist (attach to BE/BA)	Applies to project (Yes/No)	Project Complies (Yes/No)
Spotted Owl (all land allocations)		
A.1. Do not work disruptively w/in ¼ mile (1 mi. for blasting) of spotted owl activity center 3/1-9/30	NO	
A.2. Do not work outside of restriction period unless emergency work is warranted	NO	
A.3. Do not remove hazard trees unless DWD needs are met in project area as in LRMP or LSRA	NO	
A.4. Only remove hazard trees if they pose a liability to recreation residences, private landowners, campgrounds, or special use permittees	NO	
A.5. Survey projects with NRF to Regional Protocol or implement seasonal restriction	YES	YES
A.6. Use smoke management forecasts in order to minimize smoke entering into suitable habitat	NO	
A.7. Options for reducing hazards trees should be explored: topping, closing or moving sites, etc.	NO	
Spotted Owl (CHU's, LSR's, and Core Areas)		
B.1. Do not remove, downgrade, or degrade constituent elements of critical habitat	YES	YES
B.2. Promote LSOG conditions where plant associations are capable of sustaining NRF	NO	
B.3. DWD objectives are met by plant association as described in the desired LSR condition	NO	
B.4. Stands not capable of becoming NRF should be managed to provide for dispersal habitat	YES	YES
Spotted Owl (Matrix)		
C.1. Maintain 100 acres of NRF habitat (core area) around all known activity centers	NO	NO
C.2. Maintain all late-successional patches in fifth field watersheds currently comprised of 15% or less late-successional forests	YES	YES
C.3. Maintain dispersal habitat between 100-acre core areas and LSRs	YES	YES
C.4. Maintain all existing NRF habitats for connectivity	YES	YES
C.5. Promote climatic climax LSOG habitat in plant associations capable of sustaining NRF habitat	NO	
C.6. On lands not capable of becoming NRF promote that development of habitat for other LSOG dependent species	NO	
C.7. Maintain 100 acres of NRF habitat (core areas) around all newly discovered activity centers	NO	
Greater Sage Grouse (all occupied habitats)		
A.1. Do not use prescribed fire in occupied sage grouse habitats.	NO	
A.2. Include native sagebrush, forbs (especially legumes) and grasses in seed mixtures re-seeded into occupied sage grouse habitats	NO	
A.3. Do not develop springs for livestock water.	NO	
A.4. Do not construct power lines, communication towers or other tall structures within 2 miles of occupied sage grouse habitat	NO	
A.5. Do not use pesticides in occupied sage grouse habitat	NO	
A.6. Treat noxious weeds & other invasive plants in sage grouse habitat	NO	
A.7. Do not allow winter/drought supplemental feeding of livestock in occupied sage grouse habitat	NO	
A.8. Do not increase existing road densities in occupied sage grouse habitat	NO	
Greater Sage Grouse (all occupied habitats) continued.		
A.9. Do not develop new campgrounds in occupied sage grouse habitat	NO	
A.10. Do not pursue or approve land exchanges that transfer occupied sage grouse habitat	NO	
A.11. Grazing use levels should be at light use (21 to 40% utilization or less)	NO	
A.12. In development of grazing plans, have thorough resource inventories and identify potential conflict between sage grouse and livestock	NO	
A.13. Do not locate wind-generated power structures in occupied sage grouse habitat or within 2 miles of leks	NO	
A.14. Do not allow surface occupancy with 1 km (0.6 mi.) of occupied sage grouse habitat	NO	
A.15. Do not allow habitat loss by mineral development and related actions in high quality nesting, early and late brood rearing, and winter habitats.	NO	
A.16. Vegetation treatments are appropriate to soil, climate and landform of the area. Vegetative manipulations benefit health of sage grouse habitat.	NO	
A.17. Reduce wild horse numbers (if wild horse grazing determined to detrimentally affect sage grouse habitat quality.	NO	

Greater Sage Grouse (breeding habitat)		
B.1. Maintain sagebrush CC between 15%-25%, height between 15-30 in, herbaceous cover >7 in with 15% or greater CC for grasses and 10% or greater for forbs	NO	
B.2. Do not manipulate sagebrush and it's herbaceous understory within 4 miles of mapped leks being used by non-migratory sage grouse	NO	
B.3. Do not construct any above-ground structures within 0.6 mi of mapped leks	NO	
B.4. In an analysis area (100,000 ac), do not manipulate habitat if ≥ 40% of original breeding habitat has been previously lost or degraded	NO	
B.5. Do not authorize energy or mineral associated facilities within 1 km (0.6 mi.) of leks	NO	
B.6. Prohibit human activities within .3 mi. of leks from 1 hour before sunrise until 4 hours after sunrise and 1 hour before sunset until 1 hour after sunset from 2/15-5/15	NO	
B.7. In Wyoming Big SB, do not treat >20% of habitat in 30yrs (20 yrs for mountain big SB)	NO	
B.8. Do not concentrate livestock or place salt or mineral supplements on or within ¼ mi. of mapped sage grouse leks during breeding season	NO	
B.9. Do not authorize events of more than 25 people in sage grouse breeding habitat	NO	
B.10. Do not conduct vegetation treatments or improvement projects in breeding habitats 2/15-6/30	NO	
Greater Sage Grouse (summer-late brood rearing habitat [mapped as summer and fall use areas])		
C.1. Maintain sagebrush CC between 10%-25%, >15% CC for grasses & forbs	NO	
C.2. Do not remove sagebrush habitat within 0.2 mi. of sage grouse foraging areas	NO	
C.3. If sagebrush reduction projects are needed because CC exceeds 35%, use brush beating in strips 10 to 25 feet wide in areas with high shrub CC	NO	
C.4. Install wildlife escape ramps in all existing and new livestock water troughs	NO	
Greater Sage Grouse (winter habitat [mapped as winter or year-long habitats])		
D.1. Sagebrush should protrude at least 10-14in above the snow with a CC of 10 to 30%	NO	
D.2. In an analysis area (100,000 ac), do not manipulate habitat if ≥ 40% has been previously modified	NO	
D.3. No treatment patches > 100 acres. Do not convert >20% of an analysis area in a 20-30 yr interval	NO	
D.4. Do not authorize events which require permitting and anticipate > 25 people	NO	
D.5. Do not conduct vegetation treatments or improvement projects in breeding habitats 11/15-3/15	NO	
Oregon and Columbia Spotted Frogs		
A. Do not fragment or convert wetland habitat to upland habitat through management activities	NO	
B.1. Do not allow in channel, lake, or shoreline digging except as needed for restoration	NO	
B.2. Comply with Fish PDC: (c) Sediment and Substrate 1,2,3,6,7,8,9,10, (d) Bank Stability 1,2, and (g) Livestock Grazing 3,4,5	NO	
C. No changes in stream, spring, lake, or wetland hydrology except as needed for restoration	NO	
C.1. In reservoir habitats, maintain or develop shallow water habitat with emergent veg through July	NO	
C.2. Do not allow removal of fish passage if it causes introduction of non-native species	NO	
D. Activities within the channel migration zone or 100-year floodplain are restricted 3/1 thru 5/31	NO	
Oregon and Columbia Spotted Frogs (Continued)		
E. Maintain connectivity through properly functioning streams, marsh, in stream, and floodplain vegetation. Restore native sedges, rushes, and wouldows where possible and appropriate	NO	
F. Use of pesticides, herbicides, and similar potential contaminants are prohibited in and immediately adjacent to wetland habitat. Be conservative when estimating drift to avoid any contamination	NO	

Did we implement PDC, recommendations, or terms and conditions per the BE, BA, BO?	YES
Were the PDC, recommendations, or terms and conditions as implemented, effective relative to the effect/jeopardy conclusions?	YES
What, if any, PDC, recommendations, or terms and conditions were particularly difficult to implement?	N/A
Is there a need to modify or create a new PDC to address a new or existing issue or impact?	NO